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A Glance at the Contents—

Standard Nomenclature for Coke.

The need for arriving quickly at some national nomenclature for coke sizes is emphasized on p. 311.

Distribution Superintendent Required.

Applications are invited by the Rossendale Union Gas Company for the position of Distribution Superintendent at a commencing salary of £250. [p. 339.]

N.G.C. Executive Board for Scotland.

A Meeting of the District Executive Board for Scotland of the National Gas Council was held in the Central Station Hotel, Glasgow, on April 24. Sir William Whyte occupied the chair. [p. 321.]

How to Build a Gas-Works.

In a paper before the North of England Gas Managers' Association on Friday last Mr. W. W. Atley, of Stockton-on-Tees, detailed the reconstruction work at the Stockton Gas-Works for which he has been responsible. [p. 323.]

A Coke Salesmen's Circle.

The inaugural meeting of the Coke Salesmen's Circle, representative of various gas undertakings comprising the London and Counties Coke Association, was held in London on April 19, when Mr. H. C. Smith, of Tottenham, was appointed Chairman, with Mr. W. L. Boon, Manager of the London and Counties Coke Association, as Deputy-Chairman. [p. 319.]

Change of Date of the B.I.F.

Comment on the position which has arisen as a result of the change of date for the holding of the British Industries Fair at Castle Bromwich next year is made on p. 312.

Bombay Gas Company.

More favourable conditions generally in India were reported at the ordinary general meeting of the Bombay Gas Company held in London last Friday. [p. 333.]

A New Recording Calorimeter.

Prof. Boys has invented a recording calorimeter of revolutionary design, and he described this in the Guthrie Lecture to the Institute of Physics on Friday last. [p. 310.]

South-Eastern Gas Corporation.

The first report and statement of accounts of the South-Eastern Gas Corporation were dealt with at the second ordinary general meeting held on May 2 under the chairmanship of Sir David Milne-Watson. [p. 332.]

Lighting and the Traffic Regulation Bill.

Gas is to play a new part in street safety, as it is proposed to re-impose a speed limit on motor vehicles in built-up areas, which, for the purpose of a general definition, are to be regarded, according to the proposals of the Minister of Transport, as areas artificially lighted at night. [p. 313.]

Forthcoming Engagements

May 10.—SOUTHERN ASSOCIATION.—Western District Commercial Meeting at Exeter, 2.30 p.m.

May 10 & 11.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring Meeting at Cleethorpes.

May 11.—B.C.G.A.—Midlands District Conference at Leicester.

May 12.—SCOTTISH EASTERN JUNIOR ASSOCIATION.—Annual General Meeting and Paperette Day in Heriot Watt College, Edinburgh.

May 16.—B.C.G.A.—Meeting of Executive Committee, 12 noon.

May 17.—MIDLAND ASSOCIATION.—Spring General Meeting at Leamington.

May 17.—WALES AND MONMOUTHSHIRE ASSOCIATION.—General Meeting at Cardiff.

June 5-8.—I.G.E.—Annual General Meeting, London.

EDITORIAL NOTES

Prof. Boys' New Calorimeter

On Friday last we had the privilege of sitting at the feet of the great and enjoying one of the most vivid and remarkable lectures we have ever listened to. The occasion was the Guthrie Lecture to the Institute of Physics, delivered at the Imperial Institute by that veteran scientist and manipulator, Prof. Boys. Many of our readers must remember the brilliant lecture given by Prof. Boys at the June meeting of the Institution of Gas Engineers way back in 1922. The twelve years which have elapsed since then have not dimmed the astounding vigour and ardour of spirit of Prof. Boys, and the memory of the Guthrie Lecture—attended by many responsible for the welfare of the Gas Industry—will not quickly fade. The lecture, let it be said at once, is of great significance to our Industry, and incidentally must have made the Gas Administrator at the Board of Trade, who was present, a trifle uncomfortable.

Ten years ago Prof. Boys was disssatisfied with his water-flow calorimeter; since then his life has been devoted to the design and construction of a water-flow calorimeter so excellent that Prof. Boys himself does not want to improve upon it. Two things are required for a water-flow calorimeter, the lecturer explained. Either the flow of water should be absolutely uniform; or the amount of water flowing might be inversely proportional to the volume occupied by the gas at the temperature and pressure at the moment. The new calorimeter is based on the latter principle.

Nine years passed by. Then, one night in May, 1933, Prof. Boys had, as he expressed it, a dream or vision in the night. At six o'clock in the morning—it was a Sunday—he was at work in the Gas Referees' Laboratory in Victoria Street, translating his vision into a peculiarly shaped bulb of glass—the basis of his revolutionary apparatus. Prof. Boys showed his audience this extraordinary bulb of glass and then went on to explain the underlying mathematics of its curvature. It was arrived at by a new method of correlating reciprocal quantities; and, said Prof. Boys, no mathematician would do anything so illogical. Having delved into the mysteries of radii of curvature of hyperbola, the lecturer pointed out that the result was really quite simple and that the whole working range of temperature was accurately covered.

This brought the lecturer to a description of his new calorimeter. A water wheel picks up the main amount of water, and the adjustment device adds or subtracts water so that the quantity corresponds to the gas volume at the moment. The water wheel is standard brass tubing which is cut to the required lengths. The whole device can be made in a jig, with a consequent great saving in cost. No internal moving parts, stressed Prof. Boys; and it is turned with the very slightest amount of power—a small synchronous motor which consumes a negligible amount of current. Once made, there is nothing more to trouble about; nothing can go wrong. The "water-works" costs little to make, very little to run. And as for the amount of water needed, this is only a matter of a gallon of distilled water a year. Contrast this with the large quantity of good water at present required, costing a matter of £15. A Minister of Drought, remarked Prof. Boys amid laughter, would look askance at such wastage.

The lecturer went on to explain how the gas is measured. This is accomplished by a gas pump with extreme accuracy and the amount of gas actually burned in the combustion chamber of the calorimeter unit is ½ c.ft. an hour. It was on Feb. 9 of this year that Prof. Boys designed his astonishing pump—a motor having no internal working parts and which at 2 r.p.m., delivers ½ c.ft. of gas an hour which burns with an absolutely steady flame. "A positive triumph!"

Now one of the revolutionary changes in Prof. Boys' new calorimeter is that it measures and burns dried gas. Many—perhaps most—gas undertakings are to-day supplying dried gas. In fact, in some instances, the gas actually has no dew-point. This introduces a new stage in the art of calorimetry. All existing water-flow calorimeters saturate the gas with water vapour; and this dilution of the gas burned in the calorimeter accounts for a determination of heating value of the gas 1% less than the heating value of the gas where it is consumed on premises provided with dry meters—and there are few wet meters in commission to-day. Hence the great importance of Prof. Boys' pump. To use his own words, it does not corrupt the gas with steam.

In this new instrument the gas is doled out and the water is doled out. The water actually comes out in half-minute gushes. Yet, with this intermittent flow calorimeter, after a quarter of an hour from being started up from cold, the variation in temperature of the water does not exceed one-hundredth of one degree.

The calorimeter unit. A narrow burner tube of Pyrex glass, a chimney of common glass, a combustion cylinder of glass. The whole thing everlasting. The hot acid gases do not hurt the glass. The heat lost in the combustion chamber is nineteen-twentieths of the total heat, and the cool gases pass via a base metal chamber into an ebonite tray and then through an ebonite tube which communicates with the wicked outside world. The base metal chamber is coated with a bakelite varnish unaffected by the acid gases present in the products of combustion. Early last year the combustion chamber of a calorimeter of the normal Boys type was coated with this varnish. It was run for months and then put on one side for a year to soak. It has now been running for a month night and day, and the liquid acid drip is clear water white, and it gives no reaction to ferrocyanide.

The water passes through a jacket in which is an ebonite-protected place for the thermometer; and it matters not whether the testing room is unduly hot or cold. Thence to the hot water jacket of German-silver, leaving at the same temperature as in it comes. No insulation is required.

It was at this stage in the lecture that Prof. Boys referred to an alternative method of determining the calorific value of various gases by measuring both gas and oxygen for its combustion, thereby eliminating any uncertainties due to the great dilution with nitrogen when air is drawn into a calorimeter. The lecturer pointed to a fallacy in current calorimetric practice. If, he said, the outlet temperature of the gases is the same as the inlet temperature of the air, then the tester considers everything is all right. Nothing of the sort! The gases which enter a recording calorimeter are not saturated with water vapour, but they pass out fully saturated, and, moreover, the air of England is normally 50% saturated. The exit gases carry away steam which they did not contain on entering, and the latent heat of this steam should be taken into account. It has been established that if the inlet temperature of the air is 5° C. higher than the outlet temperature of the gases, the loss of sensible heat in the gases will almost exactly balance the heat in the steam.

The lecture ended on a dramatic note. "For sixty years," said Prof. Boys, "the Gas Referees have been men of high scientific distinction. My predecessors were Sir Arthur Rucker and Prof. Tyndal, and my colleagues and their predecessors were of equal standing. This has always been considered necessary because of the technical difficulties of the questions which they had to

decide. The Gas Referees have been in the position of judges between the gas maker and the gas consumer. Though provision for appeal on their decisions is available, no appeal in all that time has ever been made and heard. Now the Board of Trade are knocking at the door of Parliament for leave to replace the Gas Referees by the cumbersome machinery of the Civil Service." Prof. Boys, having mentioned that he abandoned a lucrative consulting practice to devote his whole energies to the welfare of the Gas Industry, sat down with a gesture of disgust.

Following upon a vote of thanks to the Guthrie lecturer by Prof. H. E. Armstrong, supported by Dr. J. S. G. Thomas, Dr. Charles Carpenter said that the Gas Industry owes an incalculable debt to the Gas Referees. Why on earth are they being thrown out?

We will not enter upon this here. The purpose of this article is simply to give an impression of a lecture by an astonishingly able man who, since 1900, has made every part of his instruments with his own hands and who stands to-day an inspiration to youth not only in the Gas Industry, but of the nation.

In Prof. Boys' words, we now have a cheap, an *everlasting*, water-flow calorimeter—an *everlasting* instrument for an *everlasting* Industry. And we express the hope that the Institution of Gas Engineers will provide a platform and persuade Prof. Boys to give another lecture on his invention.

A Coke Circle

At last a Coke Salesmen's Circle has been inaugurated. It is a wise move, and it should help, not hinder, the sale of gas as well as obviously helping the sale of coke. Good coke sales spell good gas sales. Every ton of coke well sold, by which is meant sold with satisfaction, lightens the task of the gas salesman in meeting competition from other fuels. We know that the problem of how far coke and gas are complementary and to what extent they are in opposition exercises the minds of many salesmen. It can be taken, however, that normally the coke fire will displace not gas, but coal, and that it will be installed not in the occasional room, but in one where continuity of heating is required. There is no need for us to point to the popularity of the coke-fired domestic hot water boiler in the winter.

The C.S.C. starts with much greater promise of immediate success than would have obtained even five years ago. A very great improvement has been effected in the preparation of saleable coke. Not only this; there can be no doubt that the public is ever so much more "smokeless fuel minded." Again, the advances made in coke consuming equipment during the past two years should hearten every coke salesman as they will satisfy the user. The Circle has been formed under the auspices of the London and Counties Coke Association, with Mr. H. C. Smith, of Tottenham, as Chairman, and Mr. W. L. Boon, Manager of the Association, as Deputy-Chairman. For the time being membership of the Circle is confined to the staff and employees of the gas undertakings forming the Association, and already 150 members have registered—quite a good start. The C.S.C. deserves whole-hearted support, and we hope that this support will be forthcoming, and that the Circle will be the forerunner of others. The C.S.C. will be a medium whereby the salesman can ventilate his troubles and whereby the experience of others will be at his disposal. We have no doubt at all that the Circle has a great deal of useful work ahead.

A report of the inaugural meeting, at which Mr. F. A. Gulland, of Maidstone, presided and Mr. Boon gave an address on problems of coke sales, will be found on later pages of to-day's "Journal." Several interesting points were discussed, and the meeting can only be regarded as highly successful. Among these points, three especially appeal to us. We have mentioned that normally the coke fire will not displace gas. Mr. Boon has analyzed what percentage of gas business could possibly have been lost by the installation of coke fires. He found that 84% represented entirely new business. As for the remaining 16%, it has to be proved whether the gas fires purported displaced would not have been removed in any event. Moreover, the 84% of new installations, with the gas burner for ignition, represents a net gain in gas consumption. In this respect we recall that at the autumn meeting of the Institution of Gas Engineers last November Mr. H. J. Hodsman remarked that if it became standard practice in a city the size of Leeds to light fires with gas there would be a new daily load of at least half-a-million cubic feet.

Another subject raised by Mr. Boon is the mischief caused by builders, particularly speculative builders, in installing domestic coke-burning equipment wholly inadequate for the job in hand. Inadequate equipment in which coke cannot remain alight all night—and continuity of burning is one of the strongest arguments in favour of coke—is greatly hampering coke sales. It is in matters such as this that members of the C.S.C. can do good work. No opportunity should be lost to demonstrate to builders, merchants, and customers the folly of buying the cheapest equipment, which in the long run proves the most expensive.

A National Nomenclature for Coke Sizes

The third point which interests us is the reference to coke grading. Much confusion arises owing to the various undertakings having local designations for different sizes of fuel; and it was urged at the meeting that the designations of the London and Counties Coke Association should be generally adopted. We feel strongly on this point, which we have ventilated in these columns on many occasions. As long ago as 1930—in the "Journal" for Oct. 29 of that year—we asked if the time had not arrived when the Gas Industry should adopt a standard nomenclature for all coke sizes. We said: "There appear to us to be two main reasons why the definition of the various coke sizes differs from town to town. First the grading of coke into different sizes has been developed piecemeal. When it was decided to split up the coke below, say, 2½ in. into three sizes, three names had to be invented, and these were settled locally. Thus a number of names were established for the same article. Secondly, it seems to us that gas undertakings may have preferred a certain amount of flexibility in what constitutes a given coke grade, so that market demands could be balanced. We would suggest that lack of uniformity in the size of material supplied has been a source of many of the complaints which have been made against coke."

Now the grading standard for coke in use by the London and Counties Coke Association is as follows:

1. Large or unbroken coke	Over 2 in. square mesh			
2. Broken coke	Within the limits of 1 in. to 2 in. square mesh			
3. Coke boiler nuts	,,	,,	,, ½ in. to 1½ in.	,,
4. Forge beans	,,	,,	,, ⅜ in. to ⅝ in.	,,

The standard coke nomenclature which we put forward in 1930 was:

Large coke	Over 2½ in.
Broken coke	2½ in. to 1¼ in.
Nut coke	1¼ in. to ¾ in.
Bean coke	¾ in. to ½ in.
Coke breeze	½ in. to 0 in.
Screened breeze	½ in. to ¼ in.
Coke dust	¼ in. to 0 in.

We offered the above suggestion because of our opinion that any standard nomenclature should contain a series of sufficiently close gradings so that there would be no desire to subdivide them further. The suggestion also makes it clear that small coke, provided it is carefully screened, is a thoroughly good fuel for many purposes. Distinctions are drawn between coke breeze, screened breeze, and coke dust.

Many readers may think our nomenclature has advantages over the grading standard of the London and Counties Coke Association; but we should prefer to have the latter as a national standard rather than no generally accepted standard as at present. This problem of the standardization of coke nomenclature must be settled, as was again obvious from the tone of the first meeting of the Coke Salesmen's Circle.

The B.I.F.

SINCE we wrote, three weeks ago, upon the change in date of the Birmingham Section of the Fair next year from the customary February to May, the subject has been widely discussed in many circles of the Gas Industry. This is only natural since it is an event which for some years past has cost the Industry a large sum of money annually. At the same time there are grave misgivings among the chief contributors—the exhibiting firms—as to whether the expenditure in this particular form brings any adequate return in the shape of publicity to the Industry as a whole, and a general consensus of opinion among them that actual business done is negligible in face of the outlay. It is no use turning the blind eye to these facts, because they are very material, and have been openly discussed among the exhibitors themselves for several years past.

The change of date has therefore really only brought matters to a head, and it furnishes a very suitable break, so to speak, at which to take stock of the situation. The change, as we pointed out, has avowedly been made in the interests of the exporting industries, the primary purpose of the Fair being, in the words of the Authorities, "to develop our overseas trade." While naturally supporting this purpose nationally, the Gas Industry has little direct interest in it, so that it has had to consider the May date from other viewpoints. Here straightaway the consideration arises that its chief product is heat, and that a large exhibit of gas furnaces, fires, lights, &c., with a number of glowing coke fires thrown in, would be definitely negative publicity on some of the days of which May is capable in England. So that if, as some sections of the Industry insist, an annual exhibit is desirable, May is not a month which could be selected for choice.

But there is another, and perhaps even more serious difficulty. However much we feel that the Gas Industry has almost a surfeit of conferences of various kinds, it must be acknowledged that it has been the concentrating force of the Joint Conferences more than anything else which has gathered together each year seniors, juniors, salesmen, and all the rest to see the admirable exhibits which have been staged at such great cost at Castle Bromwich. And a Conference there at the end of May would be out of the question, because for very good reasons and by long precedent the premier organization, the Institution, holds its annual meeting round about that date.

Those in favour of continuing to exhibit at Castle Bromwich, who, incidentally, do not include many of those who pay the piper, urge that the electrical industry, having flattered us by imitation in building up a large section of their own, must not be left the field to themselves. This argument depends entirely upon whether a gas exhibit at Castle Bromwich is deemed to give a fair return for the expenditure. If not, let the electricians try their luck there, and let us, without worrying about them, spend our money on some of the many other available forms of publicity.

It was fairly clear, then, that the Committee of the Gas Industries Section was faced with a situation in which they would have great difficulty in organizing a successful exhibit at Castle Bromwich next year, and they very wisely examined alternatives without delay. When last discussing the subject, we mooted the possibility of an extended co-operative effort at the Ideal Homes Exhibition at Olympia, but we understand there are good reasons concerned with available space, rent, and other matters which render this impracticable for the time being. But the other possibility to which we referred—a transfer of the gas exhibit to the London Section of the Fair which is still to be held in February—was, we understand, so far favourably received as to hold out every hope of success if it can be arranged. We believe, in fact, that a large section of the exhibitors of past years would co-operate in this scheme, while no pressure which could reasonably be brought to bear would persuade them to go to Castle Bromwich in May. This is the position as we see it, and no doubt the Fair Authorities will bear all the facts in mind when deciding whether they will accommodate the Gas Industry in London next year. A deputation of the Gas Industries Section Committee has waited upon them, because, apart from the question of space, some modification of regulations with regard to heating and other matters will be necessary.

We hope this will prove a solution of a question which in recent weeks has been agitating many minds. If for any reason it does not, then we must examine other possibilities. An idea which has been extensively canvassed is the holding at intervals, possibly in connection with the B.C.G.A. Annual Conferences, of an all-gas exhibition on a grand scale—a scheme which appears to hold distinct possibilities. But let us see first what the London Fair Committee can do for us.

How to Build a Gas-Works

No, we do not intend to offer an explanation. Instead, we leave it to Mr. Atley, of Stockton-on-Tees, who, in a paper before the North of England Gas Managers' Association on Friday last described in great detail the reconstruction work for which he has been responsible. It will be gathered that the paper is a long one. As a matter of fact it is the *pièce de resistance* of our technical section this week, and occupies many pages. Essentially an engineering contribution, it should prove of particular value to the rising generation of gas engineers, who will doubtless refer to it when they are called upon to carry out similar reconstruction or extension work. On this question of reference we have a suggestion to make. The younger members of our Industry would find of untold worth in their future work an index compiled from papers such as that by Mr. Atley. The time expended in its preparation would, we feel sure, be amply repaid—and, after all, the time would amount only to an hour or so a week. Then, when set an engineering task, the junior would have at his command and at a moment's notice the experience of others—experience which might well save much expense. Some of our readers may already have adopted this plan. For the others, Mr. Atley's paper should prove a useful starting point.

The author is most helpful in not only describing the difficulties encountered in installing new plant—as an example, the discovery during excavation work of a disused gasholder tank which had been filled in with clinker ashes—but giving the costs of the various items of plant. The whole account demonstrates the very great care Mr. Atley has exercised to ensure that the plant will have a long life. In this regard his factor of safety is certainly high, and readers will appreciate the many points of detail which have made this high factor possible—again as an example only, the special consideration given to the question of the expansion of the silica material in the retort settings. We are particularly interested in the pains taken by the author to prepare good coke and to market it acceptably. To maintain a high standard of quality, all the coke is stored under cover. The coke is practically uniform in moisture content and, to quote Mr. Atley, "has become quite a feature so far as marketing is concerned." And, for works of the size of Stockton-on-Tees, it is unusual to have overhead coke storage for 300 tons. We have long advocated the sale of coke in small quantities, and it is gratifying to find that this method of sale has proved so successful at Stockton. Mr. Atley sells coke in ½-cwt. lots; and we call attention to the fact that on one day last December a matter of over 48 tons was sold in this way. Transport is effected by soap-boxes and obsolescent perambulators, as will be seen from one of the photographs on later pages.

Another point which appeals to us about Mr. Atley's policy is that he provides colour in the homes of his consumers; and at Stockton-on-Tees colour is greatly to be desired. It is the author's practice to exchange all simple-hire cookers on a change of tenancy. The cookers are brought to the reconditioning shop at the works, where they are thoroughly cleaned and overhauled, spray-painted with a grey mottled finish, and stoved; and we are not surprised to learn that this plan has

greatly increased the demand. Gas fires are also reconditioned and spray-painted with lacquer to any desired colour, and "shading effects have become quite a speciality and very popular."

Altogether Mr. Atley's paper is a satisfying story, and the author now possesses a works of which he may justifiably be proud.

Fixed Coal Prices

THE Gas Industry is badly handicapped by the provisions of Part I. of the Coal Mines Act of 1930, which have deprived undertakings of the free purchasing market they formerly enjoyed. Dr. Charles Carpenter did good service in 1933 and again this year by informing shareholders in the South Metropolitan Gas Company—and through them the public in general—of this burden. At the general meeting of the Company in 1933 Dr. Carpenter explained that prices are fixed behind closed doors by a Committee of Coalowners, and also that through being de-classed as industrial users, our Industry pays a higher price than do iron and steel makers and those who own and operate coke ovens. At the meeting this year he emphasized again that there is no free market in coal, as regards either quantity or price, and expressed the hope that the mining industry would be given an opportunity to adopt natural, instead of artificial, remedies. The remedies of fixed quotas and minimum prices are worse than the diseases they were designed to alleviate. Certainly they are remedies which are holding up the price of gas.

In exceptional circumstances only does the "JOURNAL" deal in anonymous correspondence either in its own columns or elsewhere, but, in view of the foregoing, we call attention to a letter by "R. C. H.," of Lancashire, published in the *Colliery Guardian*. His argument is a straightforward one—that it is not much use getting an increased quota to be shipped abroad at an uneconomic price and letting the inland market for the higher-priced coals gradually wane. His solution is equally straightforward. "Bluntly," he says, "domestic coal must be so reduced in price that householders will not think twice about either electric fires or gas fires. To do this economically, obviously the coal-owner must get the difference from the producer of electricity and gas, as the industrial consumer cannot stand a higher price." And he suggests an immediate reduction of 10s. per ton on all good house coal "as a beginning."

We leave it to the statistically minded to work out what the additional cost of gas would be to the millions of users of gas cookers, and to the satisfied users of gas fires who would be most unwilling to return to paper, sticks, and dirt, quite apart from the cost of replacing their gas equipment with coal grates. "R. C. H." is, it is true, an extremist. At the same time the Gas Industry must be continually on its guard against the policy which inspires him.

Lamp Posts as Traffic Signs

IF, as is expected, the proposals of the Traffic Regulation Bill become law, a new significance will be given to our very old friend the lamp post. We have never ceased to urge the importance of good street lighting in connection with accident prevention, and our readers in the Gas Industry know that modern methods of effecting it by gas cannot be improved upon. Where impartiality prevails, gas holds its own every time, and only ignorance or bias regards it as out of date. But gas, and for that matter electricity, are to play a new part in street safety, as it is proposed to re-impose a speed limit on motor vehicles in built-up areas, which, for the purpose of a general definition, are to be regarded, according to the proposals of the Minister of Transport, as areas artificially lighted at night.

This proposal, at first sight, caused some perturbation among suppliers of public illumination. Psychologically the connecting of a public lamp with a danger area necessitating a speed limit seemed altogether wrong, when we wish to foster the perfectly correct impression that good street lighting is one of the chief factors in road safety. But apart from this point, which we do not think need cause much worry, others have questioned whether the street lamp is not a somewhat arbitrary standard by which to determine speed-limit areas. Will special signs have to be attached to the extreme lights on all approaches to a built-up area, to help the motorist to know more certainly when he is entering or leaving one? Will he be liable to penalties for speeding past a light at night which is not lighted, because in the particular district economy is practised at certain phases of the moon or after midnight? Many such questions can be asked, but we can safely leave them to Parliament, with the comment that it is surely between the law and the motorist; and many will hold the opinion that if any doubt in the motorist's mind causes him to slow up and hunt for lamp posts, so much the better.

In our view the Bill, if it becomes law, should be of benefit rather than otherwise to the public lighting industries. The new significance of the street lamp is likely to call attention to cases of inefficient public lighting, and where local authorities have been stingy in the matter in the past, it may be possible to stir them to better efforts in the future. Moreover, however little the recent road accident propaganda has touched the mind, and heart, of the individual motorist—and unhappily the ghastly casualty list shows no sign yet of abating—the nation is undoubtedly shocked, and everybody is agreed that everybody else should take more care. No one need fear that local authorities will wish to decrease their no-limit areas by pulling down lamp posts. They are far more likely to extend them by adding streets and roads to those already artificially lighted, and gas undertakings will be wise, we think, to be ready to put forward schemes for extended and improved lighting all over the country.

Holding Companies

DISCUSSING this question in the "JOURNAL" for April 11 we said that a holding company is justified only if it results in better service to the consumer. We remarked: "It has yet to be proved that holding companies *per se* will, by saving in bulk purchasing, actually effect substantial reduction in the price of gas. A holding company is not a magic formula. . . . Indiscriminate centralization should be regarded with disfavour." On the other hand, we emphasized the many advantages which should accrue from well-planned amalgamations having as nuclei highly skilled research and established and efficiently organized training sections. We firmly believe that the success of the Gas Industry will rest upon the development of such nuclei to the best advantage. In the matter of staff training the benefits of amalgamation have already been appreciated by the consumer, and in the industrial field the small undertaking has at command the resources of the large.

Now we have the results of the South-Eastern Gas Corporation for the period from Dec. 3, 1932—the date of incorporation—to March 31 last. Sir David Milne-Watson, the Chairman, addressing shareholders at the general meeting on Wednesday last, described the occasion as historic—and this is no exaggeration, for the Corporation is a pioneer without exact precedents, and obviously the success or otherwise of its working has significance for the future of the Industry. We think there will be general agreement that the results of the first year fully justify the Corporation's inception. This year every company within the group is without exception showing increased production of gas, and already the Corporation has been instrumental in effecting reductions in the price of gas in three of the companies, while price reductions in several other companies are at the moment having consideration.

At present the Corporation controls companies serving an area of 720 square miles and having a popu-

lation of 500,000; and there is indication that further developments will take place this year. It is for this reason that we welcome Sir David's explanation of the Corporation's policy. "There is no danger," he said, "in the Corporation of sterilization at the hands of an unwieldy bureaucracy." Sir David emphasized that, in regard to the companies taken over, the responsibility of the "man on the spot" has in no way been reduced. While, however, the "men on the spot" retain their executive authority, they now have at command resources which no small local undertaking could possibly enjoy. What these resources are and what they mean are dealt with by Sir David in his address, which is fully reported on later pages of to-day's "JOURNAL." The strength of the South-Eastern Gas Corporation is the nucleus upon which we have laid such stress; and we think that the Industry in general—quite apart from the shareholders in the Corporation—will regard the results to date of the Corporation as being most satisfactory.

"Bats"

WHEN commenting on the Presidential Address of Mr. S. Hole, of Bath, to the Western Junior Gas Association —last week's "JOURNAL," p. 248—we referred to the work of Mr. Arthur Marsden, of Bristol, on the distribution of ash in coal. It has been suggested that this reference is liable to give the impression that only following publication of the results of Mr. Marsden's investigation did the Bath Gas Company pay close attention to this important question of "bats." Such an impression, which was, of course, never intended, would be quite wrong. We know that for many years the Company has kept a strict check on the coal received, and it was this strict attention to testing which made possible the agreement with the Somerset Collieries as to an ash content clause, which was described by Mr. Hole, and which has been of such value to the Industry. We are glad to emphasize this point.

PERSONAL

RETIREMENT OF MR. R. C. MACDONALD.

On Wednesday, April 25, 1934, in the presence of the Officers and mechanical staff of the South Metropolitan Gas Company, a presentation was made by Dr. Charles Carpenter, C.B.E. (President of the Company), to Mr. Robert C. Macdonald, Chief Mechanical Superintendent, on the occasion of his retirement.

In making the presentation on behalf of the staff, Dr. Carpenter referred to Mr. Macdonald's long association (from 1888 to 1916) with the firm of Sir William Arrol & Co., Ltd., before his entry into the Gas Industry. In this firm he had risen to the post of Works Manager, and during his service with them he had been responsible for the erection by Sir William Arrol & Co., Ltd., of the Queen Alexandra Bridge at Sunderland and of the Transporter Bridge over the river Tees at Middlesbrough. Dr. Carpenter said that he had known Mr. Macdonald for some years before he selected him in 1916 for the position of Chief Mechanical Engineer in the South Metropolitan Gas Company, and he had already formed a high opinion of his qualifications. For 18 years Mr. Macdonald had been responsible for the efficient maintenance of the whole of the mechanical plant of the Company and, in particular, had supervised the work connected with the improvement of the Arrol-Foulis charging machines and the standardization of the various parts of this type of charging machine, which is now employed exclusively in the retort houses of the Company. Dr. Carpenter further said that if any object lesson could be drawn from Mr. Macdonald's work it was his complete devotion to duty, and he commended this fact to the notice of the younger generation.

Mr. Macdonald is a member of the Institution of Civil Engineers and a member of the Institution of Mechanical Engineers. He is also keenly interested in matters pertaining to "Safety First," and at the time of his retirement was a member of several Committees of the National "Safety First" Association. He is also a Vice-Chairman of the Commercial Motor Users' Association, and a member of two Committees of the British Standards Institution.

The presentation consisted of a silver fruit bowl and candlesticks, the inscription on the former reading—

> Presented to Robert C. Macdonald, M.Inst.C.E., M.I.Mech.E., by his colleagues of the South Metropolitan Gas Company as a token of their sincere regard upon the occasion of his retirement. April 30, 1934.

* * *

Dr. WILLIAM YOUNG, O.B.E., Chairman of the West Calder Gas Company, was last week honoured by the community of West Calder and further afield, on his completion of half a century's professional and public service. To mark the occasion, Dr. Young was presented with a silver salver bearing suitable inscription, together with a cheque; a gold card case for Mrs. Young, and an exquisite set of brushes to Miss Young. The presentation coincided with Dr. and Mrs. Young's golden wedding.

* * *

Mr. EDWARD WILSHAW, J.P., F.C.I.S., Deputy-Chairman of the Romford Gas Company, has been appointed a Director of the Marconi International Marine Communication Company, Ltd., and the Eastern Telegraph Company (France), Ltd.

OBITUARY

DR. H. ZOLLIKOFER.

We regret to announce the death of Dr. H. Zollikofer on April 2 at the age of 82. Dr. Zollikofer, who gained his early experience in New York, Tilsit, and Spandau, returned to Switzerland, his native land, in 1878, and entered the employ of Sulzer Bros., with whom he remained until 1894 and for whom he was responsible for the erection of a number of gas-works in Switzerland and other countries. From 1894 to 1899 he was Manager at the Metz Gas-Works, returning to Switzerland in 1899 to become Manager at the St. Gallen Gas-Works, where he remained until his retirement in 1920. Dr. Zollikofer was a pioneer of high-pressure gas transmission, having conceived that it would reduce the cost of gas distribution. This principle was first employed by him at the Metz Gas-Works and later at the St. Gallen Works, both of which are somewhat remote from the towns they serve, and it enabled, subsequently, several outlying districts to be supplied with gas. He was also intimately concerned with the design of the various batteries of inclines installed at St. Gallen.

Through his initiative, a co-operative system for the disposal of bye-products, in addition to the purchase of coal, was adopted by the Swiss gas-works. He also played a prominent part in the development of gas appliances.

The services he rendered to the Swiss Gas Industry were recognized by his election, in 1913, as an Hon. Member of the Schweizerischer Verein Von Gas- Und Wasserfachmännern, which he had joined in 1882, and by the presentation of an honorary doctorate by the Technische Hochschule of Zurich in 1923.

Dr. Zollikofer displayed exceptional ability in the development of new ideas and their technical realization. His contributions to the Technical Press were numerous and valuable and covered a wide range of subjects, including water gas plant, the carburetting of coal gas, tar distillation, geysers, and the history of the Swiss Gas Industry.

* * *

Sir HARRIS SPENCER, who was well-known as a leader of Industry in the Midlands, died on April 30 at Edgbaston at the age of 70. He had an extensive connection with manufacturing concerns outside his own business of John Spencer, Ltd., tube manufacturers, of Wednesbury. He was Chairman of J. Brockhouse & Co., while companies of which he was a Director included the Birmingham Railway Carriage and Wagon Company and George Salter & Co. He was a Vice-President of the Federation of British Industries, a Past-President of the Birmingham and District Association of Engineering Employers, and a member of the management board of the Federation in London.

THE NEWS OF THE WEEK

In View of Increased Duties and prospective developments, the Blackpool Corporation Gas Committee have recommended the salary of the Gas Manager be increased to £1,250 a year, by yearly increments of £50.

Sanction to a Loan of £100,000 for gas main extensions is being applied for to the Ministry of Health by the Coventry Corporation. It is anticipated this loan will meet the requirements for the next five years.

There has been a Continued Increase in the output of gas at Stoke-on-Trent, states Mr. A. Mackay (the Chief Engineer and General Manager), since the Central Works at Etruria were taken over by the Corporation in 1922, which increase now amounts to 520,352,000 c.ft. over the 1922 output.

There Was a Compulsory "Lights Out" in the whole of Summertown and part of North Oxford on the night of April 30 as the result of trouble at the electricity transformer station in Staverton Road. The failure occurred shortly after nine o'clock, and the current was not restored till just before 10.30 p.m.

Among the Recent Gas Installations by the Southampton Gaslight and Coke Company are the central heating for Clark's College by means of Potterton boilers with an output of 216,000 B.Th.U. per hour, and 30 gas fires and complete kitchen equipment for the new Royal Hotel. The gas fires are of the "Panella" type used in conjunction with Nautilus flues.

Wireless by Gas.—The *Sunday Dispatch* contains an account of an invention by Mr. Alexander Rangabe to enable wireless sets to be operated by gas. He calls his invention a "Thermo Converter," and the maximum cost is stated to be £2 and the running cost less than a penny a week. It is a cylinder 6 in. long and 2 in. in diameter, and, employing a combination of alloys, "produces enough electricity to run any modern radio."

An Exhibition, jointly arranged by the Corporation Gas Department and General Gas Appliances, Ltd., has been held in Dukinfield. At the opening ceremony, Ald. J. W. Underwood, Chairman of the Gas Committee, thanked the Directors of General Gas Appliances, Ltd., who were running the exhibition. The firm's works were, he said, situated three miles away, and possibly Dukinfield men and boys had helped to make the cookers that were on view.

Edinburgh's Record Gas Output.—During the month of March the gas sent out by Edinburgh Corporation Gas Department showed an increase of 7½%. For the month of April 295,895,000 c.ft. of gas was used, against 262,294,000 c.ft. for the same period last year, an increase of 12·8%. This creates a record output for April, the previous highest being in 1927, when 235,200,000 c.ft. was used. These increases are partly due to the colder spring, but principally to the larger number of appliances in use.

An Assurance Was Given six months ago, when Darwen's new plant was inaugurated, that within a short time the atmosphere near the gas-works, polluted by fumes from the works for several years previously, would be entirely free from this nuisance. The promise has been fulfilled, and there is now not the slightest trace of this trouble to be detected. The first financial report on the reconstructed undertaking has been so good as to suggest that it will not be many years before the plant has redeemed the £26,000 spent on it.

Gas for Motor Vehicle Propulsion in France.—Following the example of the Paris Gas Company, the Compagnie du Gaz de Lyons has recently established a gas compressing station, in order to be in a position to supply cylinders of compressed gas for the operation of the engines of motor vehicles. The plant comprises a Burckhardt capable of compressing gas in four stages up to a pressure of about 2,840 lbs. per sq. in. It is also announced that the electric motor 'bus department of the Lyons municipality is also carrying out some trials of a gas-driven 'bus.

Two Cake-Baking Competitions were a feature of a series of cookery lectures and demonstrations, together with an exhibition of modern gas appliances, in conjunction with Messrs. Radiation Ltd., just completed at Alcombe and Minehead. During this period over 1,300 people attended the lectures, and considerable business has resulted. The demonstrations were conducted by Miss E. Sanderson, First-Class Diplomée N.T.S.C., Gold Medalist U.C.F.A., of Radiation Ltd., who used two of the latest types of "Bungalow New World" cookers fitted with the "Regulo" oven control. There were 55 entries for the two cake-baking competitions, the Company awarding twelve prizes in all. Messrs. J. Lyons & Co., Ltd., distributed tea free of charge at the afternoon sessions and coffee in the evenings.

A Correction.

In our report of the Presidential Address of Mr. S. Hole to the Western Junior Gas Association ["JOURNAL," May 2] the reference to a paper by Mr. A. Marsden was given as "JOURNAL" for April 25, 1928. This should have been April 5, 1933, as stated in our Editorial comment on Mr. Hole's Address.

Severn Valley Gas Corporation.

According to the *Financial Times*, holders of about 50% of the £295,932 of 5% consolidation ordinary stock of the Cheltenham and District Gas Company have accepted the offer for their security made by the Severn Valley Gas Corporation.

The Corporation was recently formed with a capital of £110,000, but a meeting was held last week to increase the amount to £1,000,000. This increase was dependent upon acceptance of the offer to Cheltenham holders. It is understood that further acquisitions are contemplated.

International Union of the Gas Industry.

A Council Meeting of the Union Internationale de l'Industrie du Gaz was held on March 10 last in Basle, the PRESIDENT, M. F. Escher, being in the chair.

Those present offered their condolence to the Association des Gaziers Belges on the death of M. H. de Le Paule, Vice-President of the Union Internationale.

From information presented to the meeting, it appears likely that between 400 and 500 members of the affiliated organizations will attend the Congress to be held in Zurich from Sept. 1 to 4 of this year. The majority of the papers which are to be presented are nearing completion.

In accordance with the rules, the Congress is being held simultaneously with the Annual Meeting of the national institution to which the President belongs—in this case the Société Suisse de l'Industrie Du Gaz et des Eaux.

The programme is as follows:

Saturday, Sept. 1—*Morning.*—General Meeting of the Société Suisse.
Afternoon.—Council Meeting of the Union Internationale.
Sunday, Sept. 2—*Morning.*—First Session of the Congress.
Evening.—Official Banquet.
Monday and Tuesday, Sept. 3 *and* 4.—Presentation and discussion of the reports prepared by the various national gas institutions, and addresses by leaders of the Gas Industry.
Tuesday, Sept. 4—*Afternoon.*—Visit to the Zurich Gas-Works at Schlieren.
Wednesday, Sept. 5.—Excursion to Lugano.

A proposal to reduce the subscriptions payable by the member bodies will be brought forward.

Attention was drawn to the International Exhibition to

THE NEWS—*continued.*

be held in Brussels from April to October, 1935, and to the fact that the Belgian Gas Industry is playing a prominent part in it. The hope was expressed that the exhibition may be supported by the Gas Industries of other countries.

M. José Rezola, of Madrid, was asked to represent the Union Internationale at the Ninth International Congress of Pure and Applied Chemistry held in that city at the beginning of April.

North of England Association.

Annual Meeting.

The Annual General Meeting of the North of England Gas Managers' Association was held on Friday, May 4, with Mr. A. PICKERING, Secretary of the South Shields Gas Company, the President, in the chair.

On the motion of the PRESIDENT, the members stood in silence for a few moments as a mark of esteem to the late Mr. Doig Gibb, a former Chief Engineer to the Newcastle and Gateshead Gas Company, who died last November.

A donation of ten guineas was contributed to the Benevolent Fund of the Institution of Gas Engineers and another of 25 guineas to the Sir Arthur Duckham Memorial Fund.

Mr. T. P. RIDLEY (Newcastle) moved that the rules, as revised, be agreed to, and the motion was carried unanimously.

The scrutineers' report as to the result of the ballot for the election of officers for the ensuing year was also unanimously agreed to.

ELECTION OF OFFICERS.

The following officers were elected:

President.—Mr. R. H. Duxbury, South Bank (Yorks).

Vice-President.—Mr. W. N. Galloway, Whitby.

Committee.—Dr. J. T. Dunn, Newcastle City Analyst; Mr. T. Hornby, Hessle; Mr. S. A. Wikner, Newcastle; and Mr. F. C. Willis, Newcastle.

Hon. Secretary.—Mr. H. Douglas Lees, Hexham.

The President-Elect was automatically elected as the representative on the Council of the Institution of Gas Engineers; and Mr. C. Dru Drury, Sunderland; Mr. H. Lees, Hexham; and Mr. N. Reed, Newcastle, were elected to the Educational Advisory Committee of the Association.

Mr. DUXBURY returned thanks for his election as President. He presented the Presidential Certificate to Mr. Pickering to mark his year of office, which, he said, Mr. Pickering had filled in a gracious and most efficient manner. He had had a strenuous year in view of the alteration to the rules, and because of the education scheme which Mr. A. C. Hovey had sponsored. Both had involved a great deal of work.

Mr. PICKERING, accepting the Certificate, briefly expressed his thanks.

Mr. W. BATT (Newcastle) moved a vote of thanks to the retiring officers, which Mr. SCOTT (Spennymoor) seconded.

Arrangements were made for a visit to the pipe works of the South Durham Steel Company and the Stockton Gas-Works on June 22.

Mr. W. W. Atlev, Engineer and General Manager to the Stockton Corporation Gas Department, then gave a paper on "Recent Reconstruction Work at Stockton-on-Tees." This is published on later pages.

Jubilee of the Junior Institution of Engineers.

The Junior Institution of Engineers is celebrating the Fiftieth Anniversary of its foundation on June 27, 28, and 29, 1934. Participation in the Jubilee Celebrations is not confined to present members of the Junior Institution, but is extended to any persons who have at any time been members of the Junior Association since its foundation in 1884.

The Celebration will be inaugurated by an official luncheon on Wednesday, June 27. At 5.30 p.m. representatives of the Institution will be received by the Lord Mayor and the Lady Mayoress at the Mansion House. At 8.30 p.m. the President, Mr. W. J. Tennant, and Mrs. Tennant, will receive the guests at a Conversazione at the Science Museum, South Kensington. On Thursday evening, June 28, following a visit in the afternoon to a Works in the London area, a special meeting will be held at the Royal Society of Arts at which the Quadrennial Gustave Canet Memorial Lecture will be delivered. The Celebration will conclude on Friday, June 29, with a Festival Dinner and Dance in the Whitehall Rooms of the Hotel Metropole, Northumberland Avenue, at 7.30 p.m.

Any members of the Institution of Gas Engineers who have at any time been members of the Junior Institution of Engineers are invited to apply to the Secretary of the Junior Institution at 39, Victoria Street, S.W. 1, for a form on which tickets for the various functions may be obtained; or such forms may be secured from the Secretary of the Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1. All applications for tickets should be received by May 31, 1934.

Gas Traffic Bollards.

A short while ago the Belfast Corporation Gas Department installed two gas-illuminated street traffic bollards as an experiment to show the local Police Committee what could be done in this direction. The Committee were so pleased with them that they have now decided to erect a further 22 such bollards at an estimated cost of £165, as against £352 for electrically illuminated installations. The annual maintenance cost of £4 per site (two bollards) for gas compared with £11 10s. for electricity. Our photograph shows the two experimental bollards originally erected. The building in the background is the new Northern Ireland Law Courts, which was only recently completed.

Forthcoming Centenary.

In two years' time the Gas Undertaking of the Teignmouth Urban District Council will reach its centenary, having been established by the Town Improvement Commissioners under the powers of the General Town Act of 1836.

In this connection the *Teignmouth Post* published an article setting out the history of the Undertaking and giving a description of the works. It was mentioned that the works were established on the present site on the shore of the river Teign. For the first 70 years coal was brought by barge to the works jetty and discharged direct into the stores. It is now the practice to take a portion of a large cargo and bring it into the works by rail.

In 1923, the Council considered a 10-year plan to reconstruct the undertaking. The capital borrowed for the reconstruction amounted to £46,666 and an almost entirely new works was erected and the mains of the town were enlarged. In 1923, the number of gas consumers was 1,909, and in 1933 they had grown to 2,626. The sale of gas was in 1923, 56 million c.ft. and in 1933 it has reached 87 million c.ft., an increase of 60%.

THE NEWS—continued.

SIR ARTHUR DUCKHAM MEMORIAL FUND

Official List of Donations from April 28 to May 4

The Committee hope to be in a position to endow a "Duckham Research Award," to be applied for the period and purpose of specified investigations of interest to the Gas Industry, at places, at home or abroad, selected as being appropriate for the conduct of each particular investigation. Subscribers, therefore, are not only paying a tribute to the memory of Sir Arthur Duckham, but are also assisting to strengthen the Gas Industry at a critical period of its development.

Name and Town.	Amount. £ s. d.
Alnwick Gas Company	1 12 0
W. Eames Caton, Oxford	2 2 0
City of Edinburgh Gas Department	100 0 0
H. J. Escreet, London	1 1 0
R. W. Foot, London	3 3 0
Guernsey Gas Light Company, Ltd.	4 4 0
City of Hereford Gas Department	5 5 0
C. Holmes Hunt, London	2 2 0
Lowestoft Water and Gas Company	3 3 0
Robert J. Philp, North Berwick	0 10 0
Pickford, Holland, & Co., Ltd., Sheffield	5 5 0
T. H. Poulson, Stafford	1 1 0
Prescot and District Gas Company	2 2 0
E. F. Smallbone, Broadstairs	1 1 0
Smethwick Corporation Gas Department	20 0 0
Southern Association of Gas Engineers and Managers	26 5 0
T. Spikins, Shanghai	0 10 0
H. E. Stone, Hong Kong	0 10 0
Stourbridge Corporation Gas Department	15 15 0
Andrew Thomson, Inverness	1 1 0
Wellman Smith Owen Engineering Corporation, Ltd., London	10 10 0
West Bromwich Corporation Gas Department	22 15 0
Donations (22) paid above	£ 229 17 0
Donations (510) paid previously	9,029 3 6
Total Donations (532) paid	£9,259 0 6
Donations (15) promised	631 4 0
Total Donations (547) paid or promised	£9,890 4 6

Exhibition and Demonstrations at Godalming.

That the inhabitants of Godalming are alive to the advantages of gas is evidenced by the fact that over 500 people attended the recent exhibition and cookery demonstrations which lasted five days.

The exhibition was arranged by the Godalming Gas and Coke Company in co-operation with Richmonds Gas Stove Company, Ltd., and a wide range of the latest cooking, heating, and hot water appliances were displayed; we understand that good business resulted. The cookery demonstrations were ably carried out by Mrs. Pigott, using a Richmonds "Bungalow New World" cooker. Once again it was shown that with this cooker a complete dinner could be cooked all together in the oven at one "Regulo" setting and entirely without attention.

Bulk Density of Coal and Coke Oven Operation.

The variation of bulk density of coal and its bearing on coke oven operation formed the subject of a paper by Messrs. G. A. Dummett and G. J. Greenfield before the Midland Section of the Coke Oven Managers' Association. From their work the authors conclude that it would be profitable to dry all coal down to about 6% water, but that further drying would be less profitable. For the sake of uniformity it would be desirable to add water to coals containing less than 6%.

It is found that the gas make varies a great deal. The surplus gas yield has been known to vary between 270,000 and 325,000 c.ft. per hour—a variation of nearly 20%.

Unless the coal in the ovens has a constant bulk density it cannot be carbonized in a uniform manner. Variations of bulk density are followed by under-coking and over-coking. In trying to avoid this, the heaters vary the rate of supply of heating gas, and the result is a bewildering succession of variations in gas production.

"We confidently believe," observed the authors, "that the main reason for these fluctuations is the variable bulk density, which will affect both the gas make and the fuel gas consumption. The principal factor in achieving constant bulk density is constant moisture content. We are convinced that if the moisture content were made substantially constant the rate of production of surplus gas would also become substantially constant.

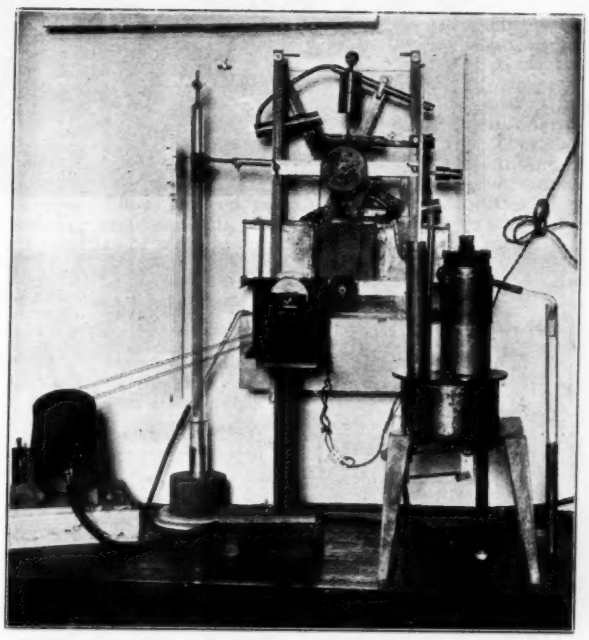
"The more constant the rate of production of gas can be made, the more accurately can the coke oven manager state the amount that he is able to supply for town or industrial use. If the large-scale consumer cannot be assured that gas will always be available at a constant rate, he must turn, partly or wholly, to other sources for his supplies.

"Besides this, the fact of drying the coal would effect a saving in fuel gas. If the average moisture were reduced from 9% to 6%, about 60 B.Th.U. per lb. would be saved. With a throughput of 1,200 tons a day and selling all the surplus at 1d. per therm this saving is worth

$$\frac{1{,}200 \times 2{,}240 \times 60}{100{,}000} \text{ pence} = £6\ 14s.\ 5d. \text{ per day,}$$

which is considerable."

Prof. C. V. Boys' New Recording Calorimeter.



Reference to this remarkable invention of Prof. Boys, who described it for the first time to the Institute of Physics last Friday, is made in our Editorial Columns to-day. The new instrument is a revolutionary change.

Presentation to Retiring Employees.

An interesting event took place on April 27 at the offices of the Herne Bay Gas Company, Ltd., when Mr. D. H. Davies, the Engineer and Manager, explained that the Superannuation Fund, which was inaugurated ten years ago by Mr. W. A. Surridge, who has been Chairman for so many years, was now operative, and that three co-partners were entitled to pension. Mr. G. J. Indermaur with 25 years' service, Mr. C. Hudson also with 25 years' service,

THE NEWS—continued.

and Mr. W. T. Harris (who was retiring through ill-health) with 11 years' service. Also it was the wish of the co-partners that a presentation should be made to the three retiring employees and which he was very pleased to say had been subscribed to by the whole of the co-partners.

Mr. Davies then presented a handsome clock, suitably engraved, to each of the above, expressing the wish that they would live long and enjoy good health.

Tests on High-Pressure Gas Cylinders.

The National Physical Laboratory at Teddington has grown in the course of 34 years to a large institution occupying 14 buildings in grounds of 50 acres. The staff of over 600 is engaged on the most varied research and test work in most branches of physics and engineering, and an exhaustive account of the work done in 1933 is given in the annual report, published last Monday (Stationery Office, 13s. net). The text is illustrated by 50 plates and diagrams.

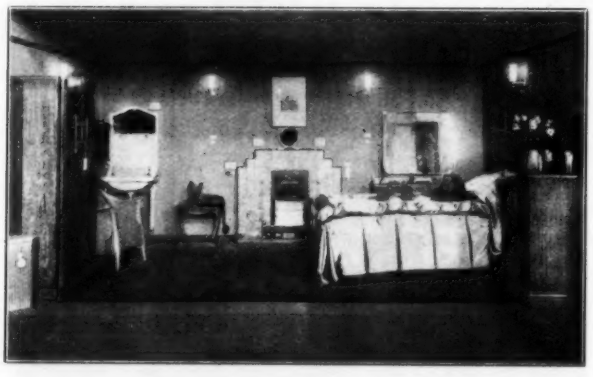
The Engineering Department made tests of cylinders for gas-propelled road vehicles. The investigations were undertaken to determine the conditions necessary for the safety of these cylinders. It is intended to carry out further tests on cylinders which have been in use for various periods to ensure that there is no serious deterioration.

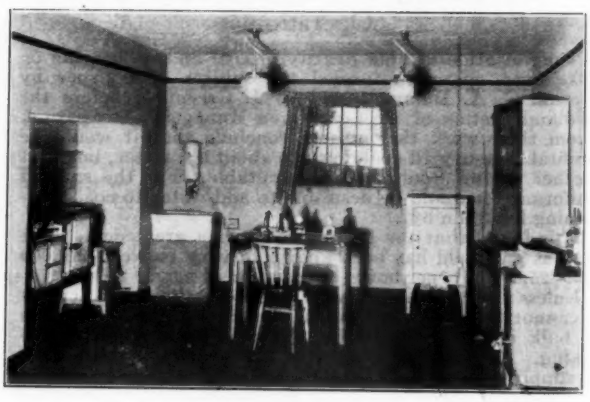
No Funds, No Light.

The cost of street lighting by gas at Great Longstone, a North Derbyshire parish, is defrayed by voluntary subscription. As stated in the "JOURNAL," the whist drives and dances held to raise the necessary funds are enormously popular among the residents.

At Orford, in Suffolk, however, there is now no public lighting owing to the local lighting committee's failure to meet last year's bill and their inability to raise funds by holding whist drives and jumble sales. It is sad for the electricity industry that Orford—a pioneer of electric lighting in East Suffolk—should have fallen upon such evil days.

Exhibition on Novel Lines at Torquay





"Over very many years of experience with gas demonstrations, I have no recollection of seeing such large and enthusiastic audiences as you brought together at Torquay."

This is an extract from a letter received by Mr. C. A. Pelley, Commercial Manager of the Torquay and Paignton Gas Company, from the sales manager of a leading firm of appliance makers referring to a gas exhibition held at the Town Hall, Torquay, from April 23 to 28.

Four model rooms were fully equipped, lights and fires being switch-controlled, all apparatus being alive. Cookery demonstrations were held at 3 and 7 p.m. daily, and the hall was packed at every session, many being unable to obtain admission. One of our photographs gives an idea of the size of the audiences. Adult and juvenile cake baking competitions were held, and in the former section 170 entries were judged.

No fewer than 7,740 persons attended the demonstrations, while visitors in large numbers inspected the displays between demonstrations.

Electricity was employed only for microphone, wireless, and top-lighting.

The idea was to break away from the usual trade show, with a succession of makers' stands, and rows of apparatus. The whole exhibition was designed with a view to demonstrating the application of gas for various purposes in settings of charm and distinction.

The type of setting is shown by the two smaller photographs which we reproduce.

The keen enthusiasm which the exhibition aroused was reflected in the large amount of space which the local Press gave to describing it—excellent publicity for the Gas Industry.

A Coke Salesmen's Circle

INAUGURAL MEETING IN LONDON

The inaugural Meeting of the Coke Salesmen's Circle was held in the St. Ermin's Hotel, Westminster, on April 19, following a lunch at the invitation of the London and Counties Coke Association. About 70 members, representing various gas undertakings of the Association, comprised the meeting.

Mr. F. A. Gulland, of the Maidstone Gas Company, was asked to take the chair.

CHAIRMAN'S ADDRESS.

Mr. Gulland opened the proceedings with an Address giving briefly the objects of the Circle.

The purpose of the Coke Salesmen's Circle, he said, is primarily to be of assistance to its members in helping them to overcome some of the difficulties which present themselves in the course of everyday business.

The increasing importance of coke marketing and the growth of severe competition necessitates more collective action than has been taken in the past, and an exchange of views and information which will lead to more efficient sales technique. The difficulties and problems presented to the average salesman are probably not entirely appreciated, and he frequently labours under the disadvantage of trying to meet troubles he cannot cure, which ultimately leads to his becoming discouraged.

It is hoped that the C.S.C. will be the medium where he can ventilate his troubles, and where the experience of others will be at his disposal who may have encountered and overcome exactly the self-same difficulties. There has, heretofore, been no such medium, and it is hoped that the C.S.C. will be a vehicle where all such matters can be freely brought for sympathetic discussion.

I feel sure that an association of this character will fill a long felt want and will be a means of very materially assisting those who are interested directly and indirectly in the sale of coke. The importance which coke has achieved justifies an association of this kind, and from this beginning will probably arise an institution taking its place with associations of a similar type which are already in active operation. The public are beginning to realize the benefits of smokeless fuels, and there is no doubt that there is a tendency towards using fuels which will not pollute our atmosphere. Probably no country in the world suffers atmospheric pollution in the same way that we do here.

The development in equipment and the propaganda which has been undertaken by Smoke Prevention Societies are tending towards the greater use of smokeless fuels, and gas coke has gained its share of use in this way. It is typical of the change which is taking place, not only in the views of the consuming public, but in the view of the Gas Undertakings themselves, to see the importance which is now attached to coke. Not so many years ago it was essentially a residual fuel, and its quality received scant consideration; to-day the conditions are very different. It is an exact fuel, and, used in the right way, a highly efficient fuel. There is still, of course, much to be done in the way of preparing the coke for sale, in improving its quality, and towards its proper application, so the Coke Salesmen's Circle will find a great deal of useful work ahead, not only in helping themselves in the promotion of sales and assisting in the elimination of difficulties, but in perhaps indirectly rendering some guidance to those who are responsible for its production.

It is proposed that at each meeting of the Circle, papers shall be presented dealing with coke matters either of a technical or non-technical description. It is further proposed that at each meeting time shall be set aside so that any subjects can be brought up by the members concerning coke, whether such material is relevant to the particular paper or not.

ELECTION OF OFFICERS.

The following elections to office were then made:

Chairman.—Mr. H. C. Smith, Tottenham and District Gas Company.

Deputy-Chairman.—Mr. W. L. Boon, London and Counties Coke Association.

Secretary.—Mr. F. A. Haddock, London and Counties Coke Association.

Committee.—Messrs. B. H. Almond (Watford and St. Albans Gas Company), W. A. Smith (Gas Light and Coke Company), W. Johnson (Wandsworth and District Gas Company), F. E. Pye (Barnet District Gas Company), J. Grayston (Lea Bridge District Gas Company), F. J. Laws (Tottenham and District Gas Company), and H. W. Kerridge (Croydon Gas Company).

Mr. Gulland then replied to queries which had been raised regarding the number of meetings per year which it was proposed should be held by the Circle. It was suggested that four meetings a year should be arranged; and as to the place of meeting, this might be settled by the Committee.

Mr. Gulland then called upon Mr. Boon to give a Paper, entitled "The Problem of Coke Sales."

PROBLEMS OF COKE SALES.

By W. BOON, Manager of the London and Counties Coke Association.

[EXTRACT.]

I think that we all agree that a great deal has been done to provide a fuel which is reasonably clean, stable in operation, and uniform in characteristics and size. On the other hand, I think that every man here would say that there is still room for improvement; but if a just comparison is made between the coke which is sold to-day and that which was marketed even five years ago, the difference will show that great credit is due to the producers. Generally the coke of to-day is a more exact commodity in every sense than it has ever been, and more attention is now being focussed on the improvement of coke than ever before. This is due, in some degree, to the more exacting requirements of coke burning appliances, and to wider variety of uses to which coke is being put. To-day there are very few people who purchase coke in the old way. Originally it was bought simply as coke, and the purchaser had to take whatever was given to him. There was no grading; there was no study of ash, moisture, density, or structure, or any consideration given to the purpose for which the fuel was required.

The situation is very different to-day, and from my own experience of many fuels I should say that coke, as produced in the modern plants, is more exact and stable than any other solid fuel.

The problems of the sales executive are mostly those that will be with him continuously, and are inseparable from the marketing of any like commodity. There are, however, alleviations which could with advantage be effected. I refer particularly to accumulated summer stocks. There is need to examine the possibilities of obtaining summer loads which would to some extent reduce the burden of large accumulations. The industrial load for coke is worthy of exploiting to a much greater extent than has been done in the past. I am of the opinion that the possibilities of using coke in the industrial field have not been sufficiently appreciated, and, consequently, the obtaining of coke business for industrial works has to some extent been neglected.

I suggest that the question of increasing industrial load should receive your close attention, and in this aspect of business the London and Counties Coke Association will be pleased to give you any assistance they can.

Another phase of development which I should like to bring to your notice is central heating. The use of oil fuel has come into prominence in recent years, particularly in connection with the larger scale heating systems for modern buildings; and whereas coke was almost universally used for central heating, there has been a serious loss of this business to oil. To a great extent the disabilities under which we have been labouring have now been removed, and we can look with confidence to a return to coke for central heating. The older types of coke fired boilers which were hand stoked were dirty in operation, and oil fuel has been adopted primarily because of its cleanliness, convenience in operation, the ease of carrying fuel stocks, and the simplicity of installation. To approach the same conditions with a coke fired system presented many problems, but I am glad to say that the majority of these have been overcome, and the development of the Gravity Feed boiler will go a long way in helping us to recover a great deal of the central heating work which has gone to oil. Further, the fuel oil tax has undoubtedly been, and will continue to be, of considerable benefit, for with this type of boiler, using coke for central heating, the operating costs are about half those of oil fuel for equivalent duty.

Already a number of important installations of the Gravity Feed boiler have been secured, and the latest of these installations is that for Winchester Cathedral. This, you will appreciate, is an important advance for coke, as

the Cathedral is a national monument. This particular installation was originally projected for oil fuel, and has been won over to coke purely on account of the benefits which are inherent with the Gravity Feed boiler. It can be said, therefore, that the problems which did present themselves as being almost insurmountable in the large central heating field have to a very great extent been overcome, and we can look with confidence to the increasing use of coke for the future central heating business.

There is, or shortly will be, on the market a boiler which is suitable either for domestic hot water or for central heating, which will be to some extent a small partner of the Gravity Feed boiler. It is designed on similar principles, and will, I hope, remove the problem of maintaining ignition in small boilers throughout the night.

This problem is not in any sense due to coke; it is due almost entirely to the inadequate appliances which, unfortunately, are being installed in such numbers. In other words, appliances are being produced by manufacturers which are quite inadequate from the point of view of combustion for the duty they are designed to fulfil practically with any fuel. This mischief is, unfortunately, being continued, particularly by the speculative builder, who is installing either central heating boilers or domestic hot water boilers, or both, and is purchasing purely on price, without any consideration or knowledge as to the suitability of the equipment for the service it is supposed to fulfil. The user of such equipment is, consequently, left to do what he can to get service out of equipment which is frequently impossible for the duty. We endeavour to provide fuel for these appliances, although we know, right at the beginning, that the promises of the builder to his client will not be fulfilled, and that the client is certain to suffer inconvenience and disappointment. This naturally leads to an endless chain of complaints, and many expedients are resorted to on these small appliances to keep the fire going throughout the night. The Association is taking steps with appliance makers, with architects, and with builders in an endeavour to show that from all points of view it is not good policy for them to install these inadequate appliances. The speculative builder is interested only in price, and you can appreciate that it is some problem to prove to him that if he bought a boiler costing £6 instead of £3 it would be a better purchase. The argument on our side is, of course, that he can make capital out of advertising the fact that he has spent additional money on adequate equipment, and that such equipment will give his client satisfaction and continuity of service. I think it is up to every one of us to demonstrate to builders, merchants, or clients, the folly of pursuing the practice of buying the cheapest equipment, as in most cases it is the most expensive in the long run.

While this address must of necessity be short, I would not like to miss this opportunity of mentioning the open coke fire. This is a particularly bright spot in the recent development and use of coke, although, as you know, there has been, and in some cases still is, suspicion that the open coke fire is, or may, displace to some extent the use of gas fires. There does not, however, seem to be any foundation for that fear. I went to some trouble to ascertain exactly what was the percentage of gas business which could have been lost by the installation of coke fires, and the results were rather illuminating. It was found that 84% of the total coke fires sold represented entirely new business, and that only 16% could be directly and indirectly traced to the replacement of gas. I feel that even this 16% would be considerably reduced if we could only ascertain whether the gas fires which they purported to displace would not have been removed in any event. Even supposing that the 16% were entirely replacements of gas fires, then the gas side of our undertakings has still made a net gain in the gas consumption which is represented by the 84% of new installations made, for each fire installed, with its gas point, does form a useful load, and from the view of coke business it is, perhaps, the most profitable of all.

The growing use of the open coke fire has been rather remarkable, in view of the fact that various undertakings have hesitated to exploit it. From figures obtained from all sources, the result of last year's sales up to Dec. 31. was over 69,000 coke fires sold, and I believe that most of these have sold themselves—that is, one installation recommends another. On all sides general satisfaction is expressed with their performances, and the only complaint seems to arise through the lack of control and the fire being too hot. This is rather difficult to overcome, as it is impossible, once the body of fuel has become incandescent, immediately to reduce its temperature.

Further complaints, and those which I consider legitimate, have been made of the coke itself. It is more essential for an open fire than in any other circumstance, that a clean fuel shall be available, free from fliers and of a low moisture content. The fuel must also be reasonably reactive, and of suitable structure.

I am a very firm believer in the future of coke as a fuel. There is no doubt that we can help to extend its use.

Discussion.

Mr. DICKENSON (Croydon Gas Company) stated that he had found that an open coke fire could be kept in all night by banking up with very small coke. His Company had been successful in obtaining considerable coke business in the industrial field, and in nearly all cases where tests had been undertaken the efficiency of the plant with coke had exceeded that with coal. He remarked that in some cases forced draught had proved of benefit, but it was not essential in most cases, particularly where boiler ratings were not excessive.

Mr. LAWS (Tottenham and District Gas Company) mentioned that a large number of domestic coke consumers were using badly constructed flues between the boiler and the chimney, and that considerable trouble in his area had been traced to this fault. Not only did the leakage cause poor efficiency, but it frequently gave the clients inadequate service from the appliance which they were trying to use. He suggested that builders of the speculative type should be approached with a view to persuading them to install a better type of flue connection, which would give lasting satisfaction to the client and more effective combustion conditions. With regard to clinker troubles on large industrial boilers, he agreed that the simple expedient of spraying steam under the fire bars prevented, to a great extent, the trouble from clinker. It made the cleaning of fires much easier, and also it extended the life of the fire bars themselves. Further, Mr. Laws said that he would like to draw particular attention to the inadequate type of refractories which were being supplied by many builders installing open coke fires, these were inferior in quality and gave rise to many complaints after the fires had been in use a short time.

[It was agreed that a useful purpose would be served if the question of using better refractories could be brought before the builders and the manufacturers of appliances.]

Mr. ALMOND (Watford and St. Albans Gas Company) asked how reserve stocks of fuel could be built up in winter if industrial consumers were obtained, which would mean that in all probability stocks would be so depleted at the beginning of the winter that they would not be able to fulfil their obligations to merchants, and to carry the normal heavy winter demand.

Mr. BOON replied to the effect that the question of obtaining industrial load was one which would require to be studied by each individual company. It would clearly be wrong policy to deplete stocks so that the normal domestic markets for the winter season could not be fulfilled; neither would it be good business to disappoint merchants. Accumulated stocks were, however, a bugbear in places where storage space was limited, and also in many instances stocks accumulated beyond the normal requirements of the surplus for winter demands. In such cases industrial loads should be sought.

Mr. COLLIER (Lea Bridge Gas Company) mentioned the fact that in many cases inquiries which were initiated for coke fuel had been taken over by the gas side; and while he realized that the gas side of the undertaking came first, he felt that gas inspectors did not give the same considerations to coke as the coke salesmen did to gas.

Mr. BOON pointed out in answer to Mr. Collier that the inspector was acting rightly for his Company, since the primary object was to sell gas, and whether an inquiry had been instituted for coke or not, it was essential, if the consumer could be persuaded to install gas, that he should do so. Failing the supply of gas, the client should, if possible, be persuaded to use coke. It should be the policy of the gas salesman to follow his company's interests, and in cases where gas could not be installed he should advise coke if there was any possibility of the client using this fuel.

Mr. ASHLEY (Gas Light and Coke Company) explained that his Company's policy was for the gas inspector to call following any inquiries, and endeavour to install gas fires, failing which coke fires would be put forward. In most cases where the former inducement had failed, the business for coke fires had been successfully obtained.

The policy of selling coke in 14 or 28 lb. bags was discussed. It was stated that the practice of the Tottenham and District Gas Company was to give a 28 lb. bag to a potential user of coke, as a trial sample.

The Folkestone Gas Company is understood to sell 28 lb. bags of coke through the retail shops. No information, however, was available as to the benefits of this trade, or the costs of distribution relating thereto. It was thought that some information on this aspect of the retail trade would be useful.

Several members referred to the question of coke grading, and it was stated that much confusion did arise owing to the various companies having names for different sizes of fuel, which have probably grown up with these companies. It was agreed, after some discussion, that the Association's grading, and their designations, was satisfactory, if it could only be generally adopted. In several instances they were told that it had taken some time to overcome the disabilities of local designations, but where the Association's gradings had been employed they were found to be satisfactory.

Mr. BOON suggested that it would be advisable if all companies could adopt the definite standards and come into line with the Association's recommendations, and while some difficulty would inevitably be caused, it would probably only be of short duration. There was no doubt that it would be to the general interest to have uniform standards.

National Gas Council

Meeting of Central Executive Board for Scotland

A Meeting of the District Executive Board for Scotland of the National Gas Council was held in the Central Station Hotel, Glasgow, on April 24. Sir WILLIAM WHYTE occupied the chair, and after the minutes of the previous meeting had been approved he referred briefly to the Report which had been issued by the Management Committee.

Sir William said that the Scottish Advisory Committee on Rivers Pollution Prevention had been dealing with individual rivers and had not so far dealt with the situation as affecting gas-works. No general policy had therefore been framed, but the Management Committee were quite able to deal with the matter when the occasion arose. The position of gas undertakings as regards income-tax allowance was set forth in the Report, and the main point was that the profits from municipal gas undertakings would be excluded from assessment. Sir William then commented on a new situation which had arisen in the coal supply market for gas coals. The Lanarkshire coalmasters had formed a combine which determined the price of gas coal in the Lanarkshire-Dumbartonshire-Renfrewshire area, and this price was from 1s. to 2s. 9d. per ton more than that previously obtaining. This precedent was being followed by others, and in some districts the position was serious. The time had now come, said Sir William, to protest, and he hoped that coalmasters would reconsider their attitude and that the former pleasant relationships between coalmaster and gas manufacturer would again prevail.

PROPOSED GAS DEVELOPMENT CENTRE.

The proposed Scottish Gas Development Centre was then discussed, and it was intimated that it was proposed to call the scheme "The Scottish Development Centre—Industrial, Domestic, Commercial." The object of the scheme is to form a Bureau of Information only, without any laboratory for research or industrial work. The duty of the scheme is to collect, tabulate, and circulate at regular intervals, or otherwise as may be expedient, information describing industrial processes, and to circulate particulars of different methods of charging for gas. The scheme is to apply to all undertakings in the membership of the National Gas Council and the cost (less than £100 per annum) will be met by subscriptions collected from the undertakings through the annual subscriptions at present paid to the National Bodies in like manner to the existing arrangement for the Education Scheme (Scotland).

The next section of the Report dealt with the Gas Undertakings Act (1934), and it was stated that the Bill was largely based on the recommendations given in the Final Report of the Gas Legislation Committee. The Central Executive Board, along with the Officers of the Council, had given intimate and long-considered attention to the new legislation. The Bill was considered unsatisfactory in two matters—viz., that the obtaining of Special Orders should be simplified, and power to make a minimum charge. A large number of private undertakings in Scotland will come under the Bill and the Management Committee consider that the control to be placed on non-statutory undertakings cannot be unfair or difficult.

The setting up by the Scottish National Development Council of a Committee to review the position in Scotland as regards the extraction of oil from coal and shale was referred to, and Sir William complimented Mr. H. G. Ritchie, of Falkirk, on his election to this Committee.

The other matters dealt with by the Report were Publicity Propaganda and the Scottish Education Scheme. In connection with the former the following points were set forth as being of great importance in view of the intensive campaign inaugurated by the British Electrical Development Association. These points were:

(1) Need for and importance of the greatest degree of efficiency possible in every undertaking.
(2) Necessity for increased support for the National Organizations.
(3) The value of Development Centres, and the importance of giving them every support.
(4) The necessity of introducing improved methods of charge.

DISCUSSION ON THE REPORT.

Mr. J. MILLER THOMSON (Chairman, Cowdenbeath Gas Company, Ltd.) said that he wished to comment on the report, and in particular on that section dealing with the Gas Undertakings Bill (1934). He said that the Bill dealt with non-statutory companies in three sections, and he felt that the situation had not received the consideration which it deserved. In Scotland, under the Act of 1920, a non-statutory company, in order to obtain statutory powers, had to make application to the Secretary of State or to the Board of Trade. Now under the proposed new legislation the Board could compel any concern to become statutory. A point which had apparently been overlooked was that if a company were proved to be inefficient then at the moment local authorities had the power to step in and compel the company to comply with the Statutory Regulations. The new Bill would remove this power from local authorities, who did not seem to be aware that when the new Bill became law the Burgh Gas Supply Act would become obsolete. He considered the new measure to be a retrograde step, as he thought that the Gas Industry could do very well without Board of Trade control. He did not want to raise a motion at the moment, but he hoped that this question might be ventilated, as the report was not enlightening. He wondered if the question had been considered from the Scottish standpoint, and he proposed that the report should be sent back to the Council with an amendment that the section of the Bill dealing with the enforcement of Statutory Powers be non-applicable to Scotland.

Sir WILLIAM WHYTE asked Mr. Miller Thomson to defer making a motion at this stage.

Mr. JAMES BELL (Dumbarton) said that in reference to the income-tax allowance on public supplies he had noticed that last year, under claims for replacement, a sum had been deducted for wear and tear. He could not see the logic in excluding profits from assessment and then deducting a sum for wear and tear, and he felt that it was merely a case of granting something and then taking it away in another form.

Mr. R. A. MACLAREN (Newton-on-Ayr) asked if, in the event of a non-statutory company becoming statutory, there was any formula which, given the price of the gas, would determine the dividend.

Mr. S. S. OGILVIE (Joint Manager of the N.G.C.) said that there was no such formula, but the adoption of the prevailing price should give the same dividend.

Mr. J. W. NAPIER (Alloa), in reply to Mr. Bell's question about income-tax, stated that he had gone into this difficult matter with the Inspector of Taxes, and he could assure Mr. Bell that the deduction for depreciation was in good order. He hoped to be able to obtain rules on this matter, and he would distribute them.

Mr. OGILVIE, in regard to the point raised by Mr. Miller Thomson, said he was surprised to find that the suggestions embodied in the Bill were regarded as novel, since they had been made to the Board of Trade in 1927. At the various District meetings which he had attended the members had not always been enthusiastic, but this was the first time the matter had been raised formally. He could not see any objection to the provisions regulating pressure and freedom from hydrogen sulphide, as it would not do any company any good to supply impure gas at inadequate pressure. Undertakings of over 30 million c.ft. make, and those of 20 millions or more, if the local authority was dissatisfied with the present conditions, would require to become statutory and would be subject to certain provisions, some of which would be beneficial. The undertaking would be authorized to supply gas under conditions laid down in the Bill and would have the right to open up roads and highways. They would also be allowed to charge for gas on a thermal basis, which would be for the good of the undertaking and the consumer, as all users of industrial fuel now thought in terms of therms. The fact that the quality of the gas would be tested was also a good thing. The regulations concerning capital and price constituted one section of the Bill with which the National Gas Council themselves were not just satisfied, and Mr. Ogilvie suggested that it might be possible to induce the Board of Trade to amend these regulations. He was quite sure that the Board of Trade would take a broad view in this matter, for he had never heard of any case in which a gas undertaking had been unfairly treated by the Board. Undertakings over 30 millions should realize that it would be for the good of the consumers that they should become statutory and form part of the general gas code. The financial restrictions were a Board of Trade idea, but, said Mr. Ogilvie, taking all and all no one would suffer.

Mr. BELL said that if he had his own choice he would prefer to be a non-statutory company under the 1920 Act, but he had no doubt that the new regulations would materially benefit the consumers who paid the dividends and used the products of gas undertakings. The adoption of the provisions and the acceptance of the responsibilities thus entailed would mean more supervision and work for the manager and his staff, but the consumers would benefit. It was thus to the ultimate good of any concern to adopt the provisions, since it was to have tests made by a neutral person, for these assured the consumers and exonerated the manager from blame.

Mr. T. W. HARPER (Ayr) remarked that he represented a non-statutory company, and the only thing he feared from the new Bill was the loss of financial liberty. He had nothing to

fear from the provisions as regards pressure and purity, but he was concerned about the financial interference. He wanted to know what would happen to a company working with only a nominal capital. When this company became statutory would it pay a dividend of 10%, less tax, or would the dividend remain as formerly? This question would require to be opened up, for, though the statutory powers were good and necessary, companies working with a low capital would be seriously affected.

Mr. OGILVIE said that no attempt would be made to cut down dividends, but he would suggest that such a company should adjust its capital on a 5% basis. Companies under the new regulations would not have freedom to make reserve funds for specific purposes, but could have general reserve funds.

Mr. ROBERT COWIE (Hawick) said that though working under non-statutory conditions he did not fear the provisions of the new Bill. He asked about slot meters under the new Bill, and wondered if they would be allowed to charge extra for the use of such meters.

Mr. DAVID VASS (Perth) said that it was not quite clear in the Act as to the positions of prepayment meters in relation to ordinary meters. He wondered if they were not to have differential rates.

Mr. OGILVIE, in reply, said that the price of the gas would be the same in both cases, but an additional charge would be added for the use of the prepayment meter.

Mr. JAMES JAMIESON (Edinburgh) asked if the additional charge would require to be shown as meter rent.

Mr. OGILVIE replied that this was not necessarily so.

Mr. J. W. MCLUSKY (Glasgow) said that no bills were necessary with prepayment meters, as the transaction, once completed, was over for ever. There was no difference between slot and non-slot consumers as far as the Bill was concerned. They gave a certain service to the consumer, and this was collected through the meter.

Mr. JAMIESON observed that in Edinburgh a bill stating the amount of gas used was always made out and a copy was left with the consumer. Gas had to be shown at the domestic rate, and anything extra would have to be charged as meter rate.

Mr. S. MILNE (Aberdeen) asked how block charges would affect slot consumers.

Mr. OGILVIE said that slot users would have to be given the same block rate as ordinary consumers, and this was the case at the present time.

Mr. R. D. KEILLOR (Greenock) thought there was usually a local Provisional Order to cover the case of slot meters.

Mr. E. J. FOTTRELL (Joint Manager of the N.G.C.) said that the clauses in the Bill did not give power to make extra charges, but limited these charges. The charges were for rental, and the confusion arose because the rental was collected in the same way as the charge for the gas.

Mr. NAPIER said he was interested in non-statutory companies, and there was one point he would like to mention. He had been asked to advise a company who had been working with a small capital and paying a big dividend. He had advised them to put their house in order and increase the capital to be in keeping with their assets, and decrease the dividend. This course was being followed. Companies paying 10% dividend should reduce this to 5%, as local public opinion would not stand a 10% dividend. The capital account should be re-cast and the dividend fixed at a reasonable figure.

Mr. IZATT (Kelty) mentioned the minimum charge, and asked if it would not be possible to cut the price of gas.

Mr. OGILVIE replied that the minimum charge was really a period service charge and was chargeable whether gas was burned or not.

Mr. R. L. LAING (Brechin) thought that a meeting of the non-statutory companies should be called to discuss the proposed Bill more fully.

Mr. OGILVIE said that they could not strike out clauses in the Bill now, but he looked for instructions from the members of the Council. He would like the views of the District as a whole, not merely the non-statutory companies, as this matter concerned the Gas Industry in general.

Mr. J. MILLER THOMSON said that he would have called a meeting before now, but he thought that the non-statutory undertakings could look after their own interests. Non-statutory concerns were producing good gas, which they could sell at any price they wished, and they could buy in any market. The great difference with a non-statutory company was that it could develop from its own germ. He ventured to say that the war had exploded the fallacy of State regulation of industry. He thought that a simple amendment should be attached to the Bill to the effect that it did not apply to Scotland. Corporations did not seem to realize that the new Bill would make the Burgh Gas Supply Act a dead letter. The Industry would advance without State interference. A standard price could be fixed, and sliding scales could be brought into operation. Every company knew that it had to keep its house in order, and it could do this without the shackles of legislation. Mr. Miller Thomson then moved that this matter should be remitted back to the Committee with the instruction to call a further meeting.

Mr. ALEX. DOW (Galashiels), in seconding this motion, said that much could be said detrimental to the Bill, and he thought that this might weigh with the Board of Trade. The non-statutory companies should have had more notice, and it was only right that they should be heard now.

The CHAIRMAN said he was prepared to accept this motion.

Councillor MUTER (Edinburgh) observed that he did not wish to appear to be against this motion, but he did not think that it was likely to attain any success. The Bill represented the long labours of a Committee representing the Industry, and would be supported from all parts of the House. He did not wish to cross swords with Mr. Miller Thomson as to whether or not the State should have more control of industry, but it seemed to him to be a waste of time to ask the National Council to go forward with the matter.

Mr. OGILVIE said that the regulations complained of were framed by the Board of Trade, and therefore the Government Whips would be put on to ensure that the Bill went through. It would be difficult to show any particular reason why Scotland should be different. The only reason given was one for local authorities to deal with, not for the Gas Industry. There were a great number of non-statutory companies not in Scotland, and he would like members to recall that ample notice had been given in the monthly reports of the National Gas Council. The Scottish Office had been under a misapprehension with regard to the powers possessed by burghs to act outside their own areas. Burghs possessed the same powers as English local authorities, and an amendment would be put in the Bill to this effect. He would like to remind the meeting of the notice sent by the Central Board to undertakings of 25 millions or less urging them to consider seriously the desirability of linking up with larger concerns or of merging in a joint holding company. This step was inevitable, and was in the best interests of the Industry. Greater areas could be covered and a greater section of the community could be served. The tendency nowadays was to move out into the country, and in many new residential districts there was no gas supply.

Mr. FOTTRELL said that he must congratulate the members on their decision to form a Scottish Gas Development Centre. The title chosen was a good one. Too much emphasis should not be placed on the industrial side, for undertakings with a small industrial output might feel that the Centre did not concern them. In East Anglia, an almost entirely agricultural district, the small undertakings had benefited to the greatest extent from the formation of a Centre. At a recent meeting the original members volunteered to approach small undertakings and impress on them the advantages of participating in the work of the Centre. This, Mr. Fottrell thought, was an example which should be followed. Immediately a Centre was formed it was in touch with other Centres, and at the Bureau at Headquarters it was intended to duplicate information and circulate it among the Centres. Thus the benefits to be derived from membership of a Centre would be cumulative.

ELECTION OF OFFICERS FOR 1934-35.

Chairman.—Sir W. E. Whyte.

Vice-Chairman.—Mr. J. W. McLusky (Glasgow).

Committee.—Mr. George Braidwood (Coatbridge), Mr. James Campbell (Dunfermline), Mr. R. W. Cowie (Hawick), Bailie Gowans (Perth), Mr. George Hamilton (Barrhead), Mr. T. W. Harper (Ayr), Mr. R. D. Keillor (Greenock), Mr. John Lang (Vale of Leven), Mr. Samuel Milne (Aberdeen), Councillor Muter (Edinburgh), Mr. A. S. Nisbet (Paisley), Mr. H. G. Ritchie (Falkirk).

Secretary.—Mr. J. W. Napier (Alloa).

Representatives on the Central Executive Board with Year of Retirement.—Mr. J. W. Napier (1935); Mr. George Braidwood (1936); Mr. H. G. Ritchie (1937); Mr. John Lang (1938); with Sir W. E. Whyte as Chairman of the District.

Survey of the Lancashire Coalfield.

Examination of Seven Seams.

Proved coal resources amounting to over 4,000 million tons are estimated to be available in the Lancashire coalfield, which covers roughly a triangular area 500 square miles in extent, from Burnley in the north to Prescot in the west and Stalybridge in the east.

As part of the physical and chemical survey of our national coal resources, which aims at providing the information necessary for their utilization to the best advantage, the Department of Scientific and Industrial Research has published a report on the miscellaneous seams of the lower coal measures of this area (Fuel Research Survey Paper 32: "The Lancashire Coalfield. Miscellaneous Seams of the Lower Coal Measures." Published by H.M. Stationery Office; 2s. net.). The report gathers together the results of the examination of 19 somewhat scattered samples from seven distinct seams. The present report, together with the previous report issued (Report 19) dealing in detail with the most important of these seams—the Lower Mountain Mine—form a comprehensive survey of the coal resources of this part of Lancashire.

Recent Reconstruction Work at Stockton-on-Tees

By William W. Atley, M.Inst.C.E., Engineer and General Manager, Stockton-on-Tees Corporation Gas Department.

[Paper before the North of England Gas Managers' Association, May 4, 1934.]

When I was appointed in 1920 as Gas Engineer and Manager to the Stockton-on-Tees Corporation Gas Undertaking, the gas production was 461 million c.ft. per annum. Practically the whole of the plant, including retorts, condensers, exhausters, and purifiers was totally inadequate to cope with the demand for gas. In 1921 a comprehensive scheme of reconstruction was carried out embracing (*a*) the reconstruction of 50% of the carbonizing plant at the south end of the retort house, including the widening and heightening of the retort house itself, together with the ancillary plant for dealing with the coal and coke requirements; (*b*) erection of four overhead purifiers each 25 ft. by 35 ft. by 6 ft. deep in steel-framed brick panelled building 105 ft. by 45 ft. by 34 ft. to eaves, including a concrete revivifying floor extending over the full length and breadth of the purifiers, also oxide primary breaker, disintegrator, elevator, and band conveyor with throw-off carriage.

In 1927, a 60,000 c.ft. per hour exhauster was scrapped, and in its place was installed a Bryan Donkin steam driven exhauster, 125,000 c.ft. per hour at 50 r.p.m., complete with forced lubrication and automatic regulation of the vacuum by means of a governor connected by levers to the steam throttle valve.

A "Serpentine" water-cooled condenser, having a cooling area of 650 sq. ft., was also erected, the cooling water being re-used for coke quenching purposes.

In 1929, owing to the continual increase in consumption, it was found necessary to install boosting plant to maintain a pressure of 7½ in. water gauge on the district during peak loads.

Normally, the station governors are by-passed except for the period between 11.30 p.m. to 5.30 a.m. during which time the gas pressure is reduced to 5 in. W.G. To house the new plant a disused boiler house adjoining the exhauster house was used.

The plans provided for a new roof, dismantling division wall between exhauster and boiler houses, the insertion of several windows in the south wall, and a pit to accommodate the 24-in. diameter cast-iron connections and outlet governor. On commencing the work it was discovered that the three walls of the boiler house, which were to remain, were built direct on to the clay subsoil without footings, and, as the brick joints were of very soft mortar and some ugly cracks were noticed, it was decided to demolish and rebuild the walls to ensure safety and stability.

Two separate boosting units supplied by Messrs. Geo. Waller & Sons, of Stroud, driven by Greenwood & Batley's steam turbines of 15 B.H.P., were installed, each unit having a capacity of 350,000 c.ft. per hour. The exhaust steam from the turbines is delivered into a cylindrical boiler 2 ft. 6 in. diameter by 21 ft. long, which has the effect of—

(*a*) Condensing a good portion of exhaust steam which is re-used for coke quenching.

(*b*) Preventing the steam delivering on to the roof, thereby avoiding the deposit of dirt on roof glazing, and

(*c*) Maintaining an adjacent and damp building in a dry condition.

The boosters have proved of immense value in maintaining full gas pressure on the district, even when the holders have been practically empty, and so avoided the expense of bringing the carburetted water gas plant into operation for short periods.

Coke Screening Plant.

The existing coke screening plant was of a very indifferent character, consisting as it did of an overhead bunker into which coke and breeze was delivered from the telpher skips. Three bottom outlet doors discharged the coke direct into railway wagons. Coke required for local use was tipped in the coke yard and all hand-forked. Various types of bar screens at about 45° were fixed inside the coke bunker which gave good screening results; but, of course, there was no means of grading into the various sizes of coke nuts which is to-day so necessary for the successful marketing of coke. Handling coke in this fashion with an output that had nearly doubled between 1920 and 1928, made it imperative to provide efficient cutting and grading plant.

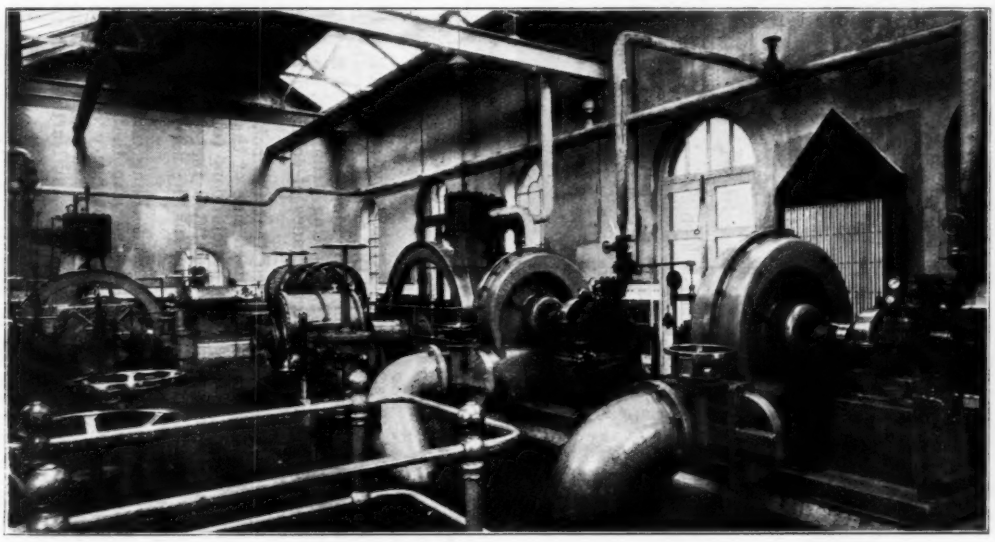


FIG. 1.—EXHAUSTER AND BOOSTING PLANT.

A number of schemes were considered, but when the sketch lay-out plans were carefully gone into there were always some snags which required to be cleared up. Eventually, a definite scheme was evolved, which consists of a Cort's coke cutter and travelling rotary screen 50 in. diameter by 24 ft. long, each capable of dealing with 30 tons of coke per hour.

The plant consists primarily of two steel structures between which is a totally enclosed gantry supporting the band conveyor and providing access between the coke-breaker and screens. On the site of the old coke bunker, previously referred to, a steel plate receiving hopper was erected, fitted with a jigging feed to deliver the coke into the coke cutter, or direct on to the troughed band conveyor which delivers the coke a distance of 75 ft. to the screens. The height of the coke receiving hopper was unalterable owing to the fact that the coke telpherage plant was already in existence, and it was not possible to raise it.

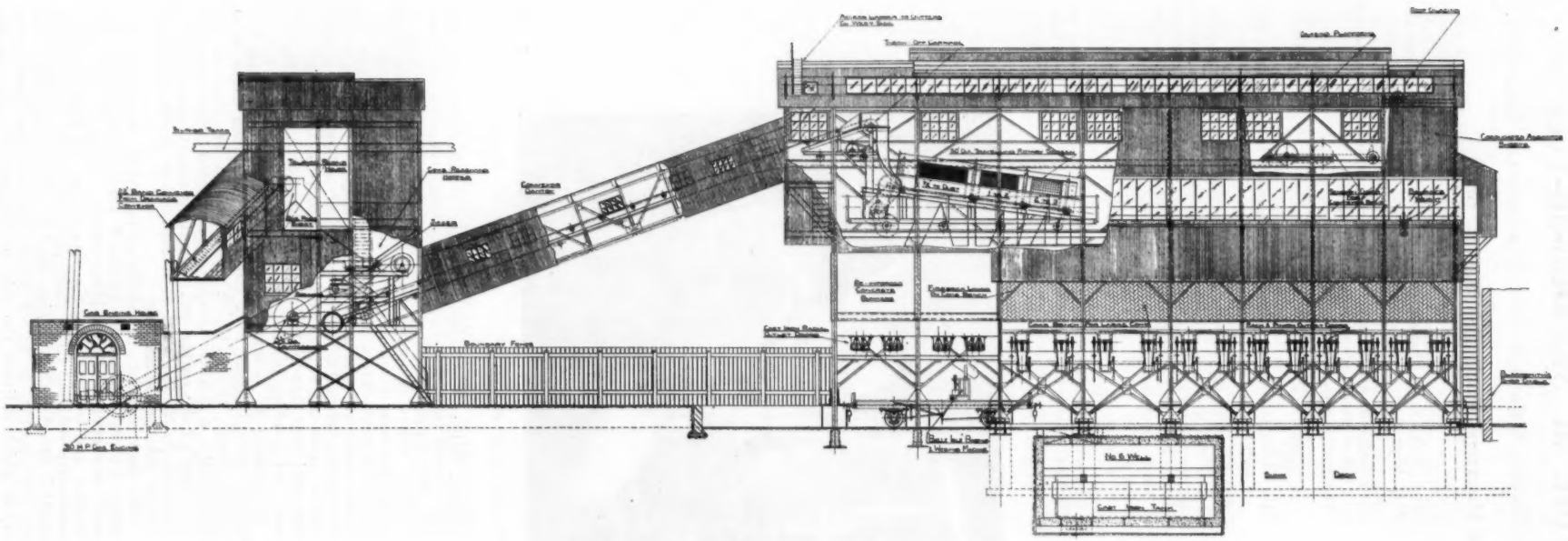


FIG. 2.—ELEVATION OF COKE SCREENING PLANT.

Site Difficulties.

The site was very congested, and it was therefore no easy matter to design a plant that would provide an economical means of screening and also allow for convenient loading direct to railway wagons, and in addition into lorries in bags as well as in bulk. The distance between the receiving hopper and screen structures was decided by the capacity of the coke bunkers, and, therefore, the height at which the screen would have to be fixed to deliver into the bunkers. It is, of course, well known that band conveyors will not work efficiently with coke at a greater inclination than 20° from the horizontal—consequently, when these details had all been carefully drawn out, the length of the band conveyor was more than I had at first anticipated.

An elevation of the coke screening plant is shown in fig. 2.

The band conveyor belt is 296 ft. long (*i.e.*, 145 ft. centres), and is driven from a countershaft by means of a 30-H.P. National gas engine.

The countershaft is fitted with three Taylor's friction clutches for operating—

(*a*) The band conveyor,
(*b*) The coke-cutter, and
(*c*) A belt driven water pump for reclaiming water for coke quenching purposes obtained from the gasholder overflows, exhauster steam condensates, &c.

The rotary screen is operated by means of a 12-H.P. electric motor (460 volts D.C.), and traverses by means of a clutch and reversing gear a distance of 54 ft. over the coke bunkers, thereby obviating trimming, in order to place 300 tons of the four grades of coke and breeze into stock.

The screen is so operated that the coke and coke nuts are directed on to the inclined side of the coke already in the bunkers between the outlet doors (except, of course, when the demand has necessitated the entire clearing of the bunkers), and by this means the need for de-breezing is practically non-existent.

The excavating for the sunk siding under the inclined coke bench for large coke, and also the main stanchion foundations, had to be carried out very carefully as the plant runs parallel and within a distance of 5 ft. from the main passenger line of the London and North-Eastern Railway on the west side, and on the east side are the gables of the blacksmith's shop and sulphate of ammonia plant house, which are 32 ft. from ground level to apex. In addition, the sunk siding had to be strengthened owing to a subway 30 ft. in width which used to pass under the railway and was filled in about thirty years ago.

The reinforced concrete retaining wall alongside the passenger railway lines was constructed in lengths of about 5 ft. at a time, and for some distance was carried out in "Ciment Fondu" to expedite the work and also to lessen the risk due to vibration caused by passing trains. For the same reason, the concrete foundation beds were all tied together longitudinally by the retaining wall between each bed. Reinforced concrete anchor ties were also placed transversely at a level to allow the railway line to clear, the timber sleepers being arranged at each side and between the ties. The first portion of the excavation was in hard blue clay, and I thought this work would be carried out economically. This supposition was, however, very far from being realized, as to my dismay we eventually came across a disused brick-lined gasholder tank approximately 90 ft. diameter, which had been filled in with clinker ashes. This tank was unknown to any of the employees except one who was 73 years of age and had a faint recollection as a young man of the tank being filled in.

Underground Well.

The scheme included the construction of an underground well, the position of which came inside the holder tank. As eight of the 12 in. by 6 in. and 8 in. by 6 in. steel stanchions, approx. 43 ft. and 23 ft. high respectively, had also to be built on the site of the gasholder tank, it was decided to pile the track of these stanchions and also the

side walls for the well into which the surface, &c., water would drain. A piling contractor was therefore engaged to carry out this work and nineteen 12 in. by 12 in. pitch pine piles, fitted with diamond pointed steel shoes, were driven. The first pile required twice lengthening by splicing as it was driven to a depth of 48 ft. from ground level before a set of ¼ in. was obtained by a blow of 2 tons through a distance of 6 ft. Fortunately, this was the longest pile that was required. The piles were cut off to an even level and a grillage formed of 12 in. by 6 in. rolled steel joists resting on the heads of the piles. The joists and heads of piles were then all concreted into one solid raft, using ample reinforcement to make a sound job and also to form the floor of the well. Although the piling was an unexpected expense, the height of the screens, coupled with the proximity to the railway, necessitated the work being of the strongest possible character, and I am pleased to say that after a lapse of more than two years no sign of settlement has taken place.

The fabrication and erection of the screening plant structure was partly carried out by Messrs. Dorman, Long, & Co., Ltd., of Middlesbrough, who also placed in position the rotary screen, purchased from Messrs. R. Cort & Co., of Reading.

The patent roof glazing on the main roof and the lean-to roof over coke bench were fixed by direct labour, as also the asbestos cement sheets, steel window sashes, &c., used to cover in the entire structure.

The removal of the old coke bunker (previously referred to) was then taken in hand. The first care was the supporting of the telpher track which still had to be used up to a point about 20 ft. from the bunker. Two timber "A" shaped trestles of strong design were constructed and well braced, to prevent any fear of movement. The bunker and telpher supports connected thereto were then removed and the 12 in. by 6 in. rolled steel joist stanchions forming the structure for coke receiving hopper and coke breaker were erected. The inclined conveyor gantry was dealt with as follows: The two sides were completed and riveted up on the ground, and the roof, bottom, and supports for band conveyor all site bolted up to ensure all members fitting properly before erection.

The coke receiving hopper, coke-cutter, and jigging feed were then erected. The band conveyor troughed idlers were all designed to a certain standard and the patterns were made locally and the necessary castings obtained. The machining and fitting up was all carried out by direct labour.

The sides and bottom of the three longitudinal coke bunkers and also the floor and end walls of the inclined coke bench were constructed in rather an unusual manner. It was decided in any case that concrete bunkers would be most suitable—avoiding corrosion, therefore reducing maintenance costs and painting to a minimum.

Consideration was given to various forms of reinforcement, and eventually it was decided to use the Superstrength system.

Description of "Superstrength" Reinforcement.

In each panel of the reinforcement the longitudinal or principal members are constructed in the form of a miniature H beam folded from light steel plate or sheet. The section of this beam has a depth of 2 in. with flanges ½ in. wide, the material being 18 standard wire gauge thick.

The members in any panel are spaced at centres necessary to provide adequate strength for the loading taken by that panel, and were an average of 2½ in. apart.

Steel cross strips ¾ in. wide by $\frac{1}{16}$ in. thick were used to position the main members, and to act as transverse reinforcement, being electrically welded to the upper and lower flanges of the H section members at spacings consistent with the loading requirements. These cross strips were spaced an average distance of 9 in. apart.

Manufacture of Reinforcement.

Cold rolled British steel strip is obtained in continuous rolls and cut into the requisite lengths. The material for the H section members mentioned previously is 3⅜ in. wide 18 standard wire gauge thick.

First Operation.—The strip is passed through a feed slide to the first operation folding machine which consists of five pairs of rollers. Forming-guides are situated between each pair of rollers, and the strip leaves this machine with the two outer edges partially folded.

Second Operation.—The partially folded member is then passed through a second operation machine of similar construction to that already described, but consisting of four pairs of rollers. In this machine the material receives its final fold.

In these operations the material passes through the machines at approximately 120 ft. per minute.

The double fold at the outer flanges of the section provides an economic utilization of metal to counteract tensile and compressive stresses, and very adequate provision is made in the deep web portion to take stresses due to the shear load. Furthermore, a considerable area of material is presented for adhesion to the concrete.

The inherent rigidity of the reinforcement necessitated only a nominal amount of concrete covering resulting in a slab of considerably reduced thickness in comparison with other forms of construction. The maximum length of panels and concrete slabs employed was 12 ft.

The depth of the reinforcement for the sides of the bunkers was 2 in., and 2½ in. for the floors and inclined coke bench. This reinforcement was placed in a wood frame and filled in with concrete consisting of four parts of ⅜ in. by ¾ in. Whinstone chippings, two parts sand and one part cement.

Whinstone was selected as it contained less sulphur than crushed slag, and also was the best material for giving the best "key" for the cement. The slabs were removed from the wood frames three days after being made and placed in a vertical position to allow air drying to take place. Two bolt holes were cast in each slab to facilitate erection. The erection was a very simple matter, and timber shuttering was only necessary to grout in the ends of the slabs and also to give a concrete protection to the portion of the stanchion inside the coke bunkers, the horizontal joints between each slab being made with cement compo.

Forty-six 18 in. by 18 in. cast iron radial doors are fitted to the bottom of the coke bunker at 3 ft. 9 in. and 5 ft. 6 in. centres. These are used for either loading direct into railway wagons placed directly under the screens, or delivered into the "Belle Isle" type of combined weigher and bag filler, carried on a condemned plate wagon 8 ft.

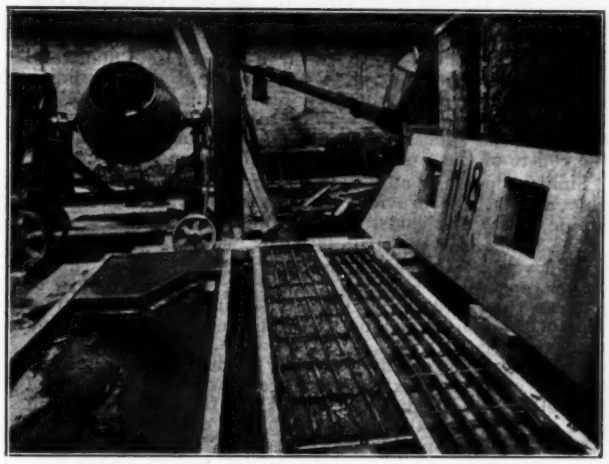


Fig 3.—Manufacture of Reinforced Concrete Slabs.

wide by 24 ft. 6 in. long purchased from the railway company. This has proved to be a very convenient arrangement, as the bag weighing truck can be shunted out of the way when the truck loads are required. Similarly, motor lorries and carts can be backed under several of the chutes and loaded in quick time. This method of coke bagging has reduced the cost from 1s. 3d. to 7d. per ton, and when necessary 4 tons can be bagged and loaded on to a motor in twenty minutes. The delay that formerly took place in loading road vehicles is now entirely eliminated, and this must be reckoned with in dealing with the road haulage costs of coke.

The question of maintenance and upkeep was carefully considered in designing the plant. To this end permanent platforms fitted with suitable hand rails have been fixed on each side of the main roof and coke bench roof to give access to clean out the gutters and also for washing the roof glazing.

Storage under Cover.

In order to maintain a high standard of quality, the coke is all stored under cover, the inclined bench having a lean-to roof. The coke is allowed to remain in the bunkers or on the inclined bench for a few hours before loading, whereby the hot coke has time to dry any pieces that contain excess moisture, the result being that the coke is almost uniform in moisture content and has become quite a feature so far as marketing is concerned.

Firmly secured to the framework of the rotary screen is a throw-off carriage which delivers the coke by means of a curved chute into the screen itself. The band conveyor is fitted with suitable tension gear consisting of special cast-iron slides working in oilbath and weighted

tension for the end driving drum, which automatically takes up the "slack" in the belt as the rotary screen travels. This consists of a separate shaft on which are fitted two small drums to which the head drum bearings are attached by means of two ½-in. diameter wire ropes. Centrally placed between these two drums is a further larger drum to which the tension weights are also attached by ½-in. wire rope and suitably guided by overhead pulleys. By attaching the tension weights to a larger drum, the required tension on the conveyor belt of approximately 1,074 lbs. is obtained by a weighted tension of 716 lbs. Under these weights is fixed a timber structure, so that in case the ½-in. diameter wire suspension rope breaks, the weights will not crash through the bottom of the bunker. It will be observed that the "drive" of the band conveyor is at the tail end, which is, of course, not desirable; but, in the special circumstances, was unavoidable. When the speed of the jigging feed was increased, thereby adding to the weight of coke conveyed by the belt, it was found that "slip" occurred on the 33-in. diameter driving drum. This has now been entirely overcome by means of thirty pieces of hard wood lagging, 2 in. by 1¼ in., secured to the drum by means of ⅜-in. countersunk bolts with spaces of 1⅜ in. between each piece.

The coke bunkers are divided longitudinally into three compartments. The centre compartment receives the coke breeze 1 in. to dust, and on each side the 1 in. by 2 in. and 2 in. by 3 in. coke nuts respectively. The large screened coke, 3 in. and upwards, is delivered on to the inclined coke bench. The floor, sides, and front wall of the inclined bench are constructed of 4 in. thick reinforced concrete slabs, and the floor covered with 2½ in. hard burnt firebricks laid herring-bone fashion. All the reinforced concrete slabs for the graded coke bunkers are 3 in. thick. To deliver coke from this bench into railway wagons, 12 openings are provided 14 in. by 18 in. in the concrete floor, and the flow of coke controlled by rack and pinion sliding doors each fitted with fourteen 3-in. diameter rollers 1¼ in. wide. These sliding doors are actuated by a chain pulley, and the coke slides down a continuous concrete apron to the centre of the truck without hand trimming.

Similar openings and sliding doors, together with suitable chutes, are provided in the front wall for loading motor lorries and carts, and also filling into bags.

The band conveyor belt is 22 in. wide by 4-ply cotton duck covered with 1/16-in. rubber on the face and 1/16-in. rubber on the underside, and has a breaking tensile strength of not less than 3,000/3,500 lbs. per sq. in. of sectional area. The belt is reinforced on the outer edges by increasing the thickness by 1/16 in. by 3 in. wide. A layer of open woven fabric not counted as a ply of duck is embedded in the top cover and extended entirely around the edges of the belt. The speed of the belt is 173 ft. per minute, and it is capable of dealing with 30 tons of coke per hour.

The original belt which has just been replaced has been in continual use for 27 months and dealt with 47,000 tons of coke. It has received very harsh treatment as it was damaged soon after it had been brought into use by the sharp edge of a protruding angle iron, and, in addition, the steel belt fastener has on occasions given a good deal of trouble. The new belt is of the endless type (costing £75 including cost of jointing on site), and I am confident that it will have a much longer life than its predecessor.

While it may be considered by some gas engineers that it is a luxury to have overhead coke storage for 300 tons, I am perfectly satisfied with the results of the new plant. All our rail traffic is dealt with by means of our own locomotives. The service of the locomotives is only required during the normal day shift, since none of the coke delivered to the coke screens is loaded during the night shift. As a result, the capacity of the overhead storage had to be large enough to allow for one or more sizes of coke not being entirely cleared each day, depending on the delivery orders received. Our experience proves that we have had very little expense in tipping coke of varying sizes since the new plant was installed.

Indicator diagrams taken of the plant under varying conditions are as follows:

		Indicated H.P.
No. 1	30 H.P. engine and 10 in. wide by 6-ply balata belt	8·8
No. 2	Coke screen band conveyor and jigger, light	10·1
No. 3	Coke screen band conveyor and jigger on load, making large coke	12·29
No. 4	Similar to No. 3 and breaker	21·04
No. 5	"Le Fleuve" band conveyor belt, light	10·16
No. 6	"Le Fleuve" band conveyor belt and coke	13·65

The standard friction for the above engine, when running at 260 r.p.m., is equal to 6·5 H.P. If this horse-power is subtracted from the above figures this will give the actual B.H.P. The costs of the plant are as follows:

	£
Excavation and foundations	962
Coke screen structure, including concrete bunkers, &c.	4,346
Coke breaker structure, hoppers, &c.	540
Coke screen and breaker	785
Coke conveyor	263
Corrugated sheeting, windows, and roof lights	200
Brick-built gas engine house	125
Gas engine	195
Shafting, gearing, &c.	50
	7,466

Carbonizing Plant.

The remaining bench of retorts, erected in the year 1902, consisting of ten beds each containing eight 15 in. by 21 in. by 19 ft. 3 in. section retorts, were long overdue for demolition. A scheme of reconstruction had been agreed upon in 1930, but before it could be carried out the Government Economy Axe came down with such force that it was decided not to proceed. As, however, the bench was in such a serious condition I was instructed to dismantle it and prepare for the foundations of the new bench. In the meantime the Committee decided that a less number of retorts would have to suffice as it was felt that the time was inopportune for providing any but the immediate needs of the Undertaking. I had, therefore, to prepare entirely new plans and specification for an amended scheme. This was approved and sanction obtained from the Ministry of Health for the necessary loan.

The proposed plant included four beds of 18 in. by 24 in. by 23 ft. long Ω shaped retorts fitted with Congdon stand pipes, "Arca" governor, "Le Fleuve" coke conveyor, coal breaker and elevator to overhead coal bunker, and Fiddes-Aldridge stoking machine. Tenders were invited under five heads, and the work was apportioned as follows:

		£	s.	d.
1.	Excavations, foundations, red brickwork, and slating	3,500	0	0
2.	Retort house steel framework and roof, coal bunkers, bench bracing, stage floor, platforms, and staircases (Messrs. J. Shewell & Co.'s Successors, Ltd., of Darlington.)	4,774	0	0
3.	Retort bench, complete with Congdon pipes and pumps (Messrs. Gibbons Bros., Ltd., of Dudley.)	8,747	0	0
4.	Coal breaker and elevator, "Le Fleuve" coke conveyor and pumps, drainage conveyor, tank, band conveyor, &c. (Messrs. Newton, Chambers, & Co., Ltd., of Thorncliffe, near Sheffield.)	4,523	10	0
5.	F.A. stoking machine and extra fire length of chain (Messrs. Aldridge & Ranken, Ltd., of Bath.)	2,550	0	0
		£24,094	10	0

The loan sanction amounted to £27,359 to allow for 5% contingencies, and certain work to be carried out by the Gas Department.

The existing retort house was widened from 52 ft. 6 in. to 66 ft. by removing the 18-in. wall between the old coal store on the west side. A steel framework was necessary to raise the height of the roof by 25 ft. to 45 ft. to eaves. The framework was filled in with 4½ in. red brick. Steel framed window sashes with semi-circular heads were built into a number of the panels to conform with the existing portion of the retort house. These sashes have a ¼-in. space at each side and over the semi-circular head, to allow for expansion and prevent the breakage of the glass panes. Special provision has been made for gaining access to the roof for slating repairs, &c., and also to enable the pressed steel gutters to be cleaned out. A timber platform and handrail extend the full length of the retort house on each side, access being obtained from the coal elevator platform on the east side and by a special stairway on the west side.

The four beds, each containing ten retorts (five tiers), are built on the site of the ten beds of "eights" previously demolished. The old regenerator tubes were taken out, and these spaces, together with the furnaces and clinkering subways, were all filled in by dry walling—with the old fire and red bricks laid on edge and using a 3 to 1 sand and cement grouting every second course. Over the whole of the site a reinforced concrete raft, varying from 2 ft. to 3 ft. 6 in. in thickness, was laid, leaving the necessary pockets for bench buckstays, &c. The regenerators are of Messrs. Gibbons Bros'. well-known type of strong design, and are giving very good results.

The furnace grates are of the hanging bar type, and only sufficient water is used to prevent the bars from heating, little or no water remaining in the ash pan. This facilitates ash handling into the telpher skips (which rest on bogies running the full length of the retort house) and also the separation of the coke at the clinker-washing plant.

The furnace feeding doors are hinged and fitted with

counter-balance weights, and after the furnaces have been completely filled up, a layer of fine damp ashes is spread over the coke and well tamped down. This has proved very effective in preventing excessive heating of the feeding doors.

Expansion of Silica Material.

The question of the expansion of the silica material in the retort settings received special consideration. The whole of the silica material was supplied by the Consett Coal and Iron Company, and from long experience they have found that their silica expands 1·2% in all directions. In order, therefore, to ensure the retorts being at the required level when at carbonizing temperature, so that the 6 in. diameter connecting pipe between the Congdon stand pipe and the retort mouthpiece would enable a satisfactory joint to be made, the retorts were set so that the first or bottom tier were $\frac{1}{4}$ in. lower than they would be when heated up to a carbonizing temperature, and so on until the top tier of retorts was actually set $1\frac{1}{4}$ in. lower. These joints were not made until complete expansion had taken place. It has been proved from long experience that these allowances are fully justified. Similarly, for the longitudinal expansion of the retorts, a space of 1 in. was left between the fireclay mouthpiece section and the cast-iron sleeve for bolting up the mouthpiece. For the side expansion two thicknesses of corrugated cardboard $\frac{3}{8}$ in. thick was built in between the arch pier walls and the 9 in. internal cross walls. Thus these walls, including the retorts, were allowed to expand up to $\frac{3}{4}$ in. without interfering with the shape of the retorts. The front and back walls of the retorts had a space of 2 in. on the underside of the retort arch. This prevented the distortion of the main arches, which often occurs on the heating up of a new bench. Nine weeks were allowed for the thorough drying out of the retorts and bench brickwork. Levels were then taken to ascertain the rate of expansion of the retorts during the period they were being gradually raised up to and beyond the critical expansion temperature of silica as follows:

Retort and Bench Brickwork.

—	148°	170°	188°	204°	240°	280°	296°	346°	465°	Total.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
Top tier	$\frac{1}{4}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{1}{4}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{16}$	$1\frac{3}{8}$
3rd tier	$\frac{5}{32}$	*Nil*	$\frac{5}{32}$	*Nil*	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$

The above expansion measurements taken on the charging side of the bench are the averages of two readings (*i.e.*, in each retort on the two tiers) on each bed. The allowances provided for in construction worked out according to calculation. Additional levels have been taken to ascertain the expansions between the temperatures of 465° and the present working temperature of 990° on the top tier of retorts, and a further expansion of $\frac{1}{4}$ in. has been noted, while the middle tier has remained practically stationary. This is after a working period of three months, making a total expansion of $1\frac{3}{8}$ in. or approximately 1·3%.

In the belief that unless easy access is provided for attending to the various parts of the plant, proper supervision will not be carried out, special attention has been paid to the necessary platforms and staircases. The platforms being of the "Safetread" type, 2 ft. wide by $1\frac{1}{2}$ in. by $\frac{1}{8}$ in. flats, and the staircases are all arranged as near as possible to an angle of 45°, and are made from 8 in. by 3 in. channel stringers, between which are bolted cast-iron treads, 2 ft. wide by 8 in., having diamond-shaped perforations and a $\frac{1}{4}$-in. lip on the outer edge to prevent slipping. This is a standard tread which has been adopted throughout the works. The platforms and staircases are all provided with solid forged steel handrail standards and two lines of $\frac{3}{4}$-in. bore steam quality tube handrailing.

An F.A. simultaneous stoking machine (which travels on the same set of tram lines as the existing Drake's combined machine) has been installed for dealing with the new retort bench, and is guaranteed to charge each retort with $17\frac{1}{2}$ cwt. of coal broken to $1\frac{1}{2}$-in. cube. A second length of charging chain is provided to charge the retorts on the south end retort bench, which are of a slightly different section. The existing Harrisson coke chute (electrically-propelled) is used for feeding the furnaces on each bench.

The Congdon stand pipes are of the usual design, but the offtake pipes to the foul main are fitted with 9 in. diameter worm and rack valves, which I considered to be a safer method than the customary plate fitted into a slide to isolate each bed.

Liquor Pumps.

Reciprocating liquor pumps in duplicate are provided, each capable of delivering 9,000 gallons per hour, working at a speed not exceeding 25 double strokes per minute. These pumps are capable of dealing with the whole of the twelve retort beds and any additions thereto, and are at present fitted with a spring-loaded reducing valve set to maintain a pump outlet pressure of 25 lbs. per sq. in. A 4,000 gallon per hour tar pump has also been installed. The liquor from the stand pipe seal pots delivers into a cast-iron tank, 7 ft. wide by 24 ft. long by 6 ft. 9 in. deep. This tank, raised 18 in. from the ground to provide as much cooling surface as possible, is divided into seven compartments. The division plates are fitted with weirs in staggered fashion to provide extended travel of the liquor. The tar is run off at regular intervals in the usual manner. On the 24-in. diameter foul main a 16-in. diameter butterfly valve and "Arca" governor has been fitted, which responds so effectively as to show a maximum deflection of *plus* or *minus* $\frac{1}{10}$ in. W.G., and will register alteration of pressure to the order of $\frac{1}{20}$ in. on a suitable recording chart. For satisfactory working we have installed a chart with graduations of $\frac{3}{4}$ in. which represents $\frac{1}{10}$ in. actual. A 24-in. diameter tee, and rack and pinion valve have been fixed to provide for the continuation of the foul gas main round the chimney stack in readiness for the conversion of the south retort bench from ascension to Congdon pipes.

Main Flue.

On the gas-works site are the buildings which were formerly used for generating the electricity required by the town. The advent of the electricity grid has, however, rendered this plant obsolescent, and therefore the brick built chimney, 140 ft. high, has been brought into use for the new retort bench. The distance between the retort bench and the chimney is approximately 175 ft., and in order to construct this flue, which cuts across the only entrance for vehicular traffic to the coke screens, &c., it was essential that it be constructed below ground level. Owing to the levels of two 24-in. gas mains and the main works drain it was necessary to excavate to a maximum depth of 19 ft. 6 in. for the concrete foundation raft of the brick flue, which was 4 ft. 6 in. wide by 5 ft. 6 in. to the underside of the semi-circular arch. On each side of the arch, which consisted of two $4\frac{1}{2}$-in. firebrick rings and one $4\frac{1}{2}$-in. red brick ring, the concrete was laid to a level of 2 in. above the crown of the arch. Three manholes are provided, one inside the retort house, another at the deepest point, and the third near the chimney. During the construction of this flue rain fell almost incessantly for nearly three weeks, and as we had to empty several of the wells (which are used in connection with the "Le Fleuve" system) to allow alteration and extension thereto, the main drain, which passes over the main flue almost at right-angles, became choked, and as a result the main flue filled with water. Although strenuous efforts were made to remove the obstruction, four days elapsed before any relief was obtained. The drain (9 in. diameter) had to be scavenged by means of a steel wire rope attached to hand winches at each end. A piece of chain attached to the wire rope was first drawn through each section of the drain, and this process was repeated; but each time an extra knot was made in the chain until the last section had been cleared. During this period portable pumps were used to keep down the water to a reasonable level; but the main flue was not entirely cleared for seven days.

We had scarcely recovered from the drain trouble when water was discovered trickling through the side walls of the main flue near the retort house gable. The dry walling inside the retort house on each side of the flue was removed to a depth of 18 in. below the concrete foundation of the flue as it was discovered that water from No. 4 well was percolating through the dry walling to the main flue. Each side of the flue was built up with a concrete "Sika" wall 6 in. to 8 in. thick. In addition, the 3-in. firebrick floor of the flue was taken up and a 3-in. "Sika-Concrete" floor laid over the portion that appeared to be porous. The bottom course of firebricks on each side of the flue was cut away to form a key for the concrete, which was reinforced by a strong mesh of expanded metal. This was tested out over a week and found to be quite watertight. The firebrick floor was then relaid, and the remaining space of each trench was then filled in with ordinary concrete, with the exception that two manholes have been made for examination purposes.

The question of water entering the flue was considered to be serious enough to warrant the construction of a manhole at the deepest point of the flue for easy access to examine the conditions. This manhole has "pigeonholed" brickwork set in compo for six courses from the bottom, and a 4-in. diameter cast-iron pipe is connected from the lowest point of the main flue to the outside manhole, the latter being 2 ft. deeper than the former. Although unexpected additional expense has been incurred in rendering the flue watertight, it was realized that considerable

damage might occur (most probably in the winter period) which would be almost irreparable.

Although there appeared to be ample pull from the chimney, we had considerable difficulty before the chimney functioned satisfactorily. Owing to the delay in completing the constructions of the underground portion of the main flue, a temporary chimney consisting of 28 ft. of 2 ft. 8 in. diameter boiler flue taken from a Lancashire boiler was fixed over the manhole on the flue in retort house, and a 4½-in. brick stopper wall built across the main flue. This enabled the heating of the retorts to be carried out over a total period of approximately nine weeks.

When the electricity works chimney was brought into operation and the boiler flue blanked off by a top plate, the chimney was found to be too cold to give the desired pull. The main dampers on the chimney between the two benches were then altered to allow the waste gases from the eight beds to pass along the new main flue, but even this did not have the desired effect. A quantity of old timber was then ignited in the flue at the base of the electricity works chimney and a brisk fire maintained for two days. The manhole covers were then all closed up again and the chimney flue connected up to the four beds of retorts. A recording pressure vacuum gauge has been connected up to the flue, and it was a great relief to find a daily increase in the pull until it reached seven-tenths. A week later the eight beds at the south end were then connected to the electricity chimney, and it was found that the pull had increased to eleven-tenths. With the eight beds working on the middle chimney, the pull was only four and a half-tenths at the outlet of the waste gas dampers on regenerators, and this was increased to six and a half-tenths with the larger chimney, which has given much better results than hitherto.

Coal-Handling Plant.

A complete coal breaking and elevating unit, similar to the two erected in 1921, has been provided, with the exception that all the belt drives, save that between the 50-h.p. gas engine and the 4½ in. diameter countershaft, are bushed roller and/or Ley's chain. The countershaft is fitted with two Plowright friction clutches to deal with the coal breaker and elevator. The drag link conveyor, which extends the full length of the overhead coal bunker, is driven by a dog clutch from the elevator head.

In view of the future extensions of the retort bench, this conveyor has been arranged to work in the reverse direction, by means of a double-faced dog clutch and a complete set of three bevel wheels. Sliding doors which are actuated by levers are fitted to the drag link conveyor. The overhead bunker has a capacity of 136 tons, equal to about 48 hours carbonizing.

In conjunction with the coal-elevating plant, a supplementary coal bunker, jigging feed and band conveyor has been provided outside the retort house, which is used for dealing with coal taken from stock (which is not easily accessible to the railway sidings) and also in case it is desired to transport coal by motor lorries. The jigging feed and band conveyor are operated by means of a dog clutch and chain drive from the coal breaker countershaft. The coal bunker is covered over with 9 in. by 3 in. timbers when not in use. Advantage has been taken of this supplementary bunker to gain another entrance and also extra ventilation to the coal breaker pit. A 50 h.p. National gas engine fitted with a 10 in. balata belt drive to the 4½ in. diameter countershaft, is housed under the charging side stage floor. Two 18 in. diameter by ¼ in. mild steel tubes with flanged joints and quarter bends terminating in the 4½ in. red brick panelling just below the eaves of the roof, provide ample ventilation and cooling. Special care has been taken to prevent coal dust from entering the engine house from the coal breaker pit, &c. The bushed roller chain drives are all encased in sheet steel gear cases fitted with oil baths. The usual gas engine cast-iron exhaust box has been dispensed with, and in its stead a 9 in. brick chamber jointed with cement compo has been built.

The chamber is divided into three compartments by building into the side walls two sets of 5 in. by 3 in. by ⅜ in. angles fitted with ½ in. distance pieces between which is fixed a loose ⅜ in. plate having ¾ in. perforations at 1¼ in. centres. The space between these perforated plates is filled in with ¾ in. by 1½ in. washed gravel. The cover of the chamber is composed of two reinforced heavy concrete slabs 6 in. thick fitted with eye bolts for lifting. These slabs are laid on the 9 in. wall and have a rebated joint along the centre. Two courses of 4½ in. wall are built round the slabs, and the ½ in. space between the 4½-in. brick and the edge of the slab is filled in with sand. The exhaust gases pipe 4 in. diameter from the engine, enters at one end of the chamber, and the outlet pipe at the other end consists of a 12 in. diameter cast-iron pipe leading to the atmosphere. This arrangement has been most efficient in silencing the exhaust, which is usually objectionable, especially when house property is in close proximity. A similar arrangement has been provided for the gas engine in connection with the "Le Fleuve" coke-conveyor plant. Indicator diagrams of the coal-handling plant show the following results:

		Indicated H.P.
No. 1	Engine and 10 in. wide by 6-ply Balata belt	11·1
No. 2	Engine and elevator, light	20·7
No. 3	Engine, breaker, and elevator on load	25·27
No. 4	Engine, breaker, and elevator and drag link, light	23
No. 5	Engine, breaker, elevator and drag link, on load	30·3

The standard friction for the above engine when running at 230 r.p.m. is equal to about 9·5 h.p. If this horse-power is subtracted from the above figures, this will give the actual B.H.P.

Coke-Handling Plant.

The "Le Fleuve" pump house, 29 ft. by 24 ft. by 13 ft. to eaves, is of red brick with panelled sides, white glazed brick interior, steel framed windows, patent roof glazing, &c. During the excavation for the foundations another unrecorded gasholder tank, approximately 72 ft. diameter, was discovered.

The position of the 50-h.p. gas engine came within the filled up portion of the tank, and piling had to again be resorted to. A McKiernan and Terry steam-driven 2-ton piling hammer was hired and twenty-two 8 in. by 8 in., approximately 18 ft. long piles fitted with chisel pointed flat sheet steel shoes, were driven along the line of the walls of the pump house and a grillage of 12 in. by 6 in. rolled steel joists forming a solid concrete raft rested on these piles, and the old wall of the gasholder tank. The same method was used for two of the foundations of the junction house where the drainage conveyor delivers the coke on to the band conveyor.

The top of the "Le Fleuve" cast-iron trough is level with the retort house stage floor, but the trough bottom has a fall of 1 in 61·5 towards the drainage conveyor. Provision has been made for the extension of this trough when additional retorts to those recently erected are built. A connection has also been made for the retort bench at the south end to be connected up as and when required. The cover of this trough comprises a series of hinged ½ in. steel chequer plates bolted to the top flanges of the cast-iron trough and supported by T iron cross bearers. When in the open position the longer sided cover plates rest on a 3 in. by ⅜ in. steel flat support bent to shape, covered with ½ in. plate, thus forming a continuous inclined surface to guide the coke from the retorts into the trough. The shorter sided plates have a wedge shaped stopper incorporated with the hinges to allow the plates, when in the open position, to rest at an inclination of 45°. By this means all coke is guided direct into the cast-iron trough. At the inlet to this trough water flows at the rate of about 1,500 gallons per minute. As the coke falls from the retorts it is immediately carried along by the rush of water to the drainage conveyor. A mild steel chimney, 2 ft. 6 in. diameter by ⅜ in. thick, is fixed on the top of the trough as it leaves the retort house and extends to a height of 5 ft. above the eaves of the roof. This chimney is fitted with a lead covered cowl to prevent down-draught and delivers into the atmosphere a good deal of the steam generated when the retorts are being discharged. When, however, the wind is in a certain direction it is not quite so efficient.

The water and coke are discharged from the cast-iron trough on to a perforated tray conveyor, the lower end of which is fixed inside a cast iron drainage tank. This tank is provided for the purpose of collecting the water and at the same time any coke or breeze that may inadvertently be washed off the drainage conveyor. The tank is provided on one side with a 24 in. diameter cast-iron outlet pipe so arranged that the whole of the water will quickly drain off. In front of the 24 in. outlet is fixed a perforated plate, ⅜ in. holes by ¼ in. thick. This plate has a total area of 26 sq. ft. and prevents coke above ⅜ in. passing into No. 2 settling tank, which will be described later. The perforated tray conveyor consists of a continuous series of perforated trays 12 in. long by 3 ft. wide by 6 in. high. The perforations are elongated ½ in. by ¼ in., having ⅜ in. centres. Plates of ¼ in. were specified, but as the required perforation could not be made in this thickness, ⅛ in. plates had to be substituted. This conveyor is set at an angle of 30° and is approximately 30 ft. between centres. Originally, a perforated back plate was fixed to each tray, but these have been partly substituted by 1 in. steam tubing flattened at each end to bolt it to the angle cleats. This was necessary as the force of the water impinging on these back plates washed some of the coke into the drainage tank. We also experienced difficulty with the cast-steel flanged rollers attached to each of the trays. The nuts securing the rollers to the trays worked loose, and this occasioned continual stoppages. To overcome this fault, ¾ in. diameter planished steel spindles have been substituted. The spindles are screwed at each end and fitted

with two ⅜ in. thick check nuts and 0·4% carbon steel sleeves. The ends of each spindle are drilled and fitted with stauffer lubricators. The cast-steel rollers are fitted with renewable phosphor bronze bushes which revolve on the spindle sleeves.

The coke is delivered from the head of the drainage conveyor on to a band conveyor, of similar design to that on the coke screens, which in turn discharges the coke by means of a chute into the telpher coke receiving hopper, and is thereafter dealt with by the coke-handling plant already described. The coke chute from the band conveyor is lined with old rubber covered conveyor belting to prevent undue breakage of the coke. This coke chute is provided with a deflecting plate so that the coke can (if required) be transported by the telpher to the storage ground, having a capacity of 6,000 tons.

The "Le Fleuve" pumps, supplied by the Pulsometer Engineering Company, are in duplicate, each or both of which can be driven by means of friction clutches fitted to a 4 in. diameter overhead counter-shaft. A 50-h.p. National gas engine is used for the motive power, which also operates the drainage conveyor by means of a balata belt drive inside the pump house and a 1¾ in. pitch bushed roller chain reduction drive to the conveyor. When the plant was started it was found that the drainage conveyor was running too slowly at 58 ft. per minute. It has since been increased to 85 ft. per minute by altering the belt pulley on the intermediate countershaft.

The "Le Fleuve" coke conveyor system requires an ample supply of water, and also an efficient method of allowing fine particles of coke carried in suspension, to settle out, to prevent undue wear of the pump. For this reason an old gasholder tank, approximately 34 ft. diameter by approximately 15 ft. deep, which had previously been used for liquor storage, was utilized as the main supply. Three other existing wells were interconnected, two of which were enlarged to allow better control of the water supply and also clearing of silt. The sequence of these wells will be dealt with later.

No. 2 settling tank, 74 ft. long by 10 ft. 6 in. wide by 5 ft. to 5 ft. 6 in. deep, was specially constructed to provide the filtering medium for the water passing from the drainage tank. It is constructed of reinforced concrete, and the floor, where it was built over an inclined approach to the clinkering subway of the old retort bench, was covered with "Sika" waterproofing compound. The tank has seven cross walls, three of which (*a*) allow the water to pass under, and four (*b*) act as weirs. The cross wall at the outlet end consists of two panels approximately 5 ft. by 4 ft. 6 in. of ⅛ in. brass wire mesh, having ⅛ in. spaces to arrest fine particles of coke dust. The cross walls (*b*) have 4 in. cast-iron flap valves inserted to drain off the water to the lower end where an 8 in. valve, about which is fitted a ⅛ in. perforated grid plate of 26 sq. ft. area, drains off the water into No. 3 well inside the retort house.

At the outlet end of No. 2 tank two flap valves are provided, one 24 in. diameter connecting to No. 3 well, and the other 15 in. diameter leading to No. 5 well. By this means, the water can be diverted into No. 3 or No. 5 well as desired, and has the advantage of giving extra cooling. In practice, the water is diverted half way through each shift. The water from No. 2 settling tank enters No. 5 well at the opposite side from the suction in order to allow for cooling and also settling of silt. The water from No. 3 can be gravitated into either No. 1 or No. 4 wells, in each of which there are pump suctions fitted with foot valves. A 10 in. diameter water balancing main fitted with flap valves at either end connects Nos. 3 and 4 wells, so that when pumping from No. 4 well a continuous supply of water is assured. A 12 in. diameter flap valve is fitted between Nos. 1 and 3 wells for convenience in cleaning No. 1 well. No. 1 well is connected to No. 5 well by a brick-lined culvert along which the 12 in. diameter suction to No. 5 well is laid. A 14 in. wall divides No. 1 well from this culvert and a 12 in. valve (operated from the surface) is built into this wall to drain off No. 1 well into No. 5 for cleaning purposes. No. 4 well was in a leaky condition, and it was made watertight by removing the existing brick paving and substituting a 6 in. reinforced concrete floor, using "Sika" composition. The walls were also rendered with cement "Sika" mixture.

The pump suctions in Nos. 4 and 5 wells are placed in sumps to provide for the wells being completely drained by the pumps, but it was found advantageous to raise the suction in No. 1 well, as silt accumulated much quicker at this point. The laying of flat-bottomed rails or light section rolled steel joists in zig-zag fashion on the floor of the wells has proved an effective trap for a good deal of silt, which would otherwise have gone forward to the pumps. This silt is removed at regular intervals.

The 12 in. diameter cast iron pump suctions from Nos. 1, 4, and 5 wells are all connected into the main suction, which is common to the two centrifugal pumps. The suctions are controlled by full-way cast-iron valves, and each terminal is fitted with a strum having ⅜ in. diameter perforations and two foot valves. The pump suctions are primed by a 2 in. diameter feed from an overhead tank fed by the belt driven pump from No. 6 well.

The 10 in. diameter cast-iron outlet from the pumps delivers the water into the coke conveyor trough. The water and coke deliver on to the perforated tray drainage conveyor—the coke going forward to the coke-screening plant and the water falling into the drainage tank and thence by a 24 in. diameter pipe into No. 2 settling tank. This settling tank has already been fully described, and it would have been advantageous if it had been made at least 4 ft. wider to facilitate precipitation of the silt. The congested nature of the site, however, would not allow of this being carried out in this instance.

Indicator diagrams of the coke-handling plant show the following results:

		Indicated H.P.
No. 1	Engine and 10 in. wide by 6-ply Balata belt	10·9
No. 2	Engine and conveyor, light	15·4
No. 3	Engine and pump A	26·4
No. 4	Engine and pump B	26·9
No. 5	Engine, pump A, drainage conveyor and coke	38·8

The standard friction for the above engine when running at 230 r.p.m. is equal to about 9·5 h.p. If this horse-power is subtracted from the above figures this will give the actual B.H.P.

The drainage tank is cleared of coke breeze after each shift, and No. 2 settling tank every week. The recovered breeze is carted away and allowed to dry off before being used under the steam boilers.

We are not in the fortunate position of having a river or stream near enough to the works to obtain a cheap supply of water. Consequently, all condensed steam, overflows from gasholders and surface water, is collected in No. 6 well opposite the coke screens. The belt driven pump near No. 5 well delivers this water into the "Le Fleuve" system. This reduces the amount of town's water required to make up for evaporation.

The following table shows the consumption and cost of water per annum for the past fourteen years, and column "X" shows the sum that would have been paid at to-day's price per 1,000 gallons:

Date.	Gallons.	Amount.	Average Price per 1000 Galls'	"X" at 11·2d.
		£	d.	£
1920	29,149,000	896	7·38	1,360
1921	38,623,000	1,264	7·86	1,802
1922	28,193,000	931	7·93	1,315
1923	19,794,000	713	8·64	923
1924	21,029,000	739	8·43	981
1925	21,806,000	725	7·98	1,017
1926	23,224,000	791	8·18	1,083
1927	19,357,000	690	8·56	903
1928	18,226,000	661	8·71	850
1929	21,706,000	731	8·09	1,012
1930	19,222,000	681	8·51	897
1931	19,878,000	675	8·15	927
1932	22,839,000	1,000	10·51	1,065
1933	14,913,000	695	11·20	695

It will be observed that by carefully studying the conservation of water supplies a saving of £665 per annum has been saved, based on to-day's price.

The "Le Fleuve" system has only been in operation for three months, but the water consumption shows a further reduction as compared with last year equal to 908,000 gallons, or a further saving of £42 per annum.

Portable Coke Bus.

With the object of reducing the arduous work and also exposure to heat of the stokers working the south end bench, I devised a travelling coke bus whereby the three upper tiers of retorts can be dealt with in a very simple manner. The coke bus (see fig. 4) consists of a rectangular shaped hopper, tapering from 13 ft. 6 in. by 8 ft. 3 in. at the top to 3 ft. 6½ in. by 2 ft. 9 in. at the bottom.

The hopper is made from ⅜ in. mild steel plate suitably braced together. A 3 in. firebrick lining, laid herring bone fashion, is secured to the steel plates by I shaped cast-iron pieces bolted at about 2 ft. 6 in. centres. The cast-iron hinged bottom door is also similarly lined. This door is operated by levers connected to a 1¾ in. diameter through shaft fitted with 2 ft. 6 in. diameter cast-iron hand wheels. The door is counterbalanced by means of a weight attached to a length of ½ in. chain secured to a 15 in. diameter chain wheel. It was found in practice that the weight of the coke being tipped by the telpher skip had the effect of opening the bottom door of the coke bus, and it was therefore decided to add a countershaft with 9 to 1 ratio spur gearing, and the hand wheels were transferred to this countershaft.

While the coke is being discharged from the two bottom tiers of retorts at the north end direct into the "Le Fleuve" conveyor, the portable coke bus into which two retorts of coke have been discharged from the south end, is propelled northwards until it is over the "Le Fleuve" conveyor trough. The stoker who drives the coke bus then operates

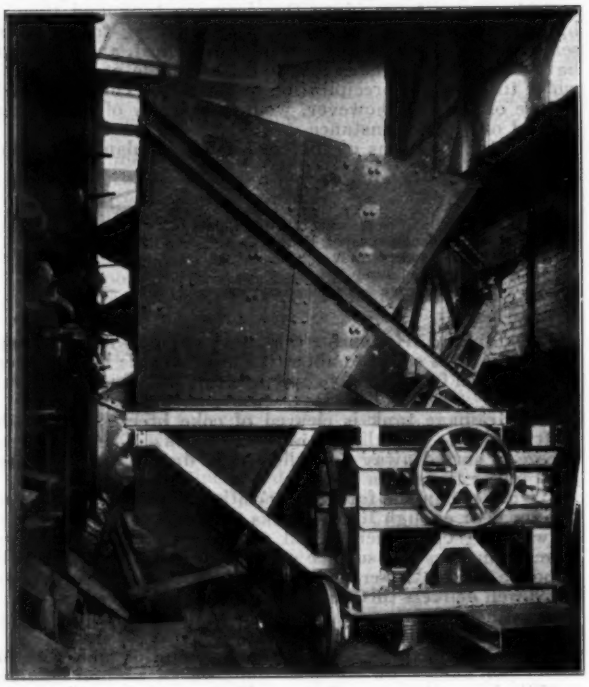


Fig. 4.—Coke Bus.

the hand wheel and allows the coke to fall into the conveyor. This has, of course, to be done steadily and at a time when no retorts are actually being pushed on the north bench. The two bottom tiers of retorts on the south bench have to be pushed into telpher skips, which are tipped into the coke bus irrespective of the position at which it is standing over the "Le Fleuve" conveyor.

This method is working satisfactorily and has the merit of dealing with the coke in two 8-hour shifts, which prevents undue wear and tear on the coke-screening plant. We have also found that the coke can be loaded from stock by "grab" and telpher skip and passed through the coke bus, thus further increasing the efficiency of the coke screens. Owing to the entirely different manner of operating the new retorts, it was decided to work two separate gangs of stokers, until the men had become accustomed to the new conditions and also to find out if the present methods could be improved upon. It is, of course, ultimately intended to operate the twelve beds with one shift of men, and it was this point that brought out the idea of the portable coke bus. The coke bus is built up on a rigid framework fitted with three flanged cast-steel tram wheels 1 ft. 10½ in. diameter on the side nearest the retort bench and three flat wheels without flange at the opposite side. The 3½ in. diameter travelling shafts are fitted with 3 in. dust proof roller bearings. The machine is driven by an 11-h.p. totally-enclosed series wound 460-volt D.C. motor, driven from two overhead wires and trolley collecting arms. The speed of the motor is 505 r.p.m., and this is geared down by two sets of spur gearing 4½ to 1 and 4 to 1, with the result that the maximum speed of the coke bus is 168 ft. per minute, or approximately 2 m.p.h. The electric motor controller is connected to a deep sounding gong which resounds all the time the controller lever is off the "stop" position. A hand-operated brake is being provided to bring the coke bus to rest at any desired point. When tipping the telpher skips into the coke bus, they invariably turned towards the retort bench instead of *vice versa*. This was overcome by fixing a F.B. rail across the top of the bus which caught the underside of the skip as it was being lowered.

Telpher.

An interesting and novel system of telpher track has been installed, and the track switch near the middle retort house chimney allows for (*a*) the old method of coke-quenching by dipping into water, or (*b*) telpher skipping the coke from the south bench to the coke bus at the north bench. Near the north end of the retort house has been constructed a hoppered bunker which is used to transfer 2 in. by 3 in. coke nuts from the coke screens (by means of railway wagons) into telpher skips, which deliver the coke on to the gantry of the carburetted water gas plant. This telpher track runs parallel with the original track and special track hangers, &c., had to be provided.

Selling Coke in Small Quantities.

The sale of coke in ½ cwt. is carried out on a considerable scale, especially during the winter months. The record maximum daily number of weighings this winter reached 1,950 or 48 tons 15 cwt. on Dec. 22. This is ordinarily carried out by one man, but he is given assistance if required to prevent long waiting of purchasers. A disused girder railway bridge was strengthened up and made into the form of a bunker fitted with four radial door outlets. This bunker is filled with nutty coke from railway wagons. The coke is fed by gravity to a "Belle Isle" coke-weighing and bag-filling machine.

The weighing is carried out much more accurately by this method than with the old scoop machines which were filled by hand-forking.

Clinker Washer.

With the idea of reducing operating costs and also to enable the surplus water to be returned to the coke quenching system, a cast-iron hopper has recently been erected. The clinker ashes are removed from the retort house by telpher and tipped into the cast-iron hopper fitted with a combined Ross feeder and screen to eliminate the ½ in. to dust portion. This hopper, feeder, and screen have been provided at an approximate cost of £298, which will be recovered in about two years, as it will save the wages of a labourer who fed the elevator by hand, and also reduce the time the clinker washer is in operation. The washing

FIG. 5.—"BELLE ISLE" COKE WEIGHING AND BAG FILLING MACHINE

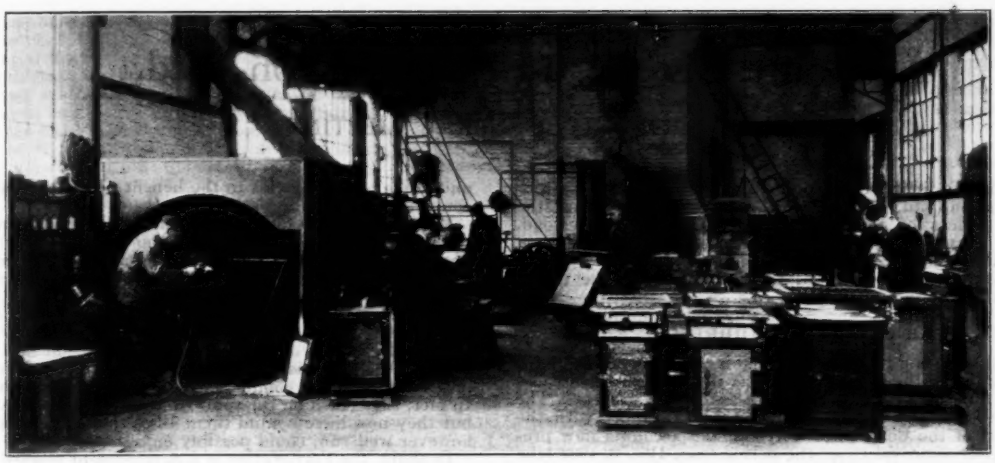


FIG. 6.—COOKER RECONDITIONING SHOP.

water contains much less slurry, and consequently the recovered coke is a better quality.

Cooker Reconditioning.

Owing to the continued popularity of gas for domestic cooking, it was necessary to provide for the increased number of cookers that required overhauling. It is the practice in Stockton to exchange all simple-hire cookers on a change of tenancy, and as we supply gas to about 29,000 houses, which will be increased this year by at least a further 900, the existing cooker repair shop was too small to cope with the work, and the site of four condemned cottages (originally used by the Electricity Department for general stores) was used to erect a steel framed building with 4½-in. brick panelling 75 ft. long by 30 ft. wide by 16 ft. high to eaves.

Large side windows and roof lights are provided. A 7½-h.p. gas engine, which originally was used for driving an exhauster at the Haverton Hill Works, operates a line shafting. Connected to this line shafting are a buffing machine (fitted with wire brush and polishing mop) pin drilling machine, B.E.N. air compressor (40 lbs. per sq. in.) fan for paint-spraying booth, fan for extracting dust from buffing machine. This latter has only recently been fixed and has proved too much for the 7½-h.p. gas engine, which is to be replaced by a larger engine.

The burners and cornice are removed from the cooker and all dirt and grease burnt off on a coke fire. The body of the cooker is then painted with a degreasing agent, and after standing for a few hours, placed in a steaming cabinet for thirty minutes. A jet of high-pressure steam is used to remove the degreasing agent and generally clean down the cooker. The cooker body is then spray painted on the turntable in the spraying booth. The cornice and door are spray-painted with a grey mottled finish and stoved, which has greatly increased the demand, as the colour effect undoubtedly pleases the taste of the housewife. Seven men and four youths are able to recondition 60/70 old and new pattern cookers per week. Gas fires are also reconditioned and spray-painted with lacquer to any desired colour. Shading effects have become quite a speciality and very popular.

In conclusion, I trust that the information contained in this paper will provoke a useful discussion. I have purposely described the difficulties that have been encountered so that the rising generation of gas Engineers will, I trust, " learn, mark, and inwardly digest " when they are called upon to carry out similar reconstruction or extension work.

I have also named the costs of the various plants, as I consider this adds to the value of a paper of this description.

The paper is to be circulated prior to the meeting, and therefore, instead of reading the paper I am arranging for a summary to be given in the form of a lantern lecture with the additional aid of several drawings of the plant.

Discussion.

Mr. F. P. Tarratt (President of the Institution of Gas Engineers) said he was interested in the question of the electricity chimney. He thought that perhaps Mr. Atley would have barred that altogether. It must have been rather costly, but perhaps he was in a fortunate position at Stockton, and, of course, he had endeavoured to stop smoke in the vicinity of the works and retort houses. As to carbonization, it no doubt paid Mr. Atley to use washed nuts. Mr. Atley was to be congratulated on having put up such a fine screening plant. It was indeed something of a luxury to have overhead storage plant of 300 tons capacity. If there was anything to regret at Stockton, it was that they had not completed the scheme when they were about it.

Mr. Atley, replying, said that the electricity chimney was a very fine one about 120 ft. in height, and to have put another down would have been more costly and it would have been difficult to find a site for it.

Mr. A. H. Bagshaw (Sunderland) moved, and Mr. J. W. Pallister (Middlesbrough) seconded, a vote of thanks to Mr. Atley, who, in his response, thanked his staff for their co-operation in the preparation of the paper.

A Hundred Years of Gas at Bradford-on-Avon.

Centenary Celebrations.

The Bradford-on-Avon Gas Company celebrated the centenary of its formation recently by a luncheon at the Swan Hotel. Mr. Henry Woodall, M.Inst.C.E., Chairman of Directors of the British Gas Light Company, of which the Bradford Company is a subsidiary, presided over a company which included most of the members of the Bradford Council and their wives, together with the County Surveyor, the District Medical Officer of Health, and other local officials.

The toast of " The Company " was proposed by Mr. A. W. Edwards, J.P., Chairman of the Bradford Council, who said the enterprise of those Bradford men who formed the Company a hundred years ago had conferred a great boon and blessing on the town, and they had had an excellent succession of local Managers. Mr. H. A. Hunt, the local Manager, and the Directors had always been most anxious to meet the wishes of the Council in the matter of public lighting, and he believed there was more gas being consumed in Bradford to-day than ever. He wished the Company increasing prosperity in the coming years.

Mr. Woodall, responding, said in a town which was an important place before the Conquest a centenary was only a small event, but a hundred years was a long time for any industrial undertaking to look back upon, and they were proud to know that the Company had been supplying gas to such an historic town for so long a period. The British Gas Light Company acquired control of the Bradford Company in 1925, and had extended the mains considerably since that date in order to improve the supply. The price had been reduced by 5d. per 1,000 c.ft., and it would always be their desire to give a good supply at as low a price as possible. Very shortly Bradford would be connected by a main with Trowbridge, and they would cease to manufacture gas in Bradford.

" Our Guests " was proposed by Mr. Graham Wilkin, a Director of the British Gas Light Company, and responded to by Mr. Alex. Wilkins, a Director of the old Bradford Gas Company, and by Capt. A. H. Baker, science master at the Secondary School, and former Chairman of the Urban District Council.

Later in the day the whole of the employees of the Company were entertained at supper at the Swan Hotel, Mr. Graham Wilkin presiding.

An exhibition of modern gas appliances is being held in the Bradford-on-Avon Town Hall during the week in commemoration of the centenary.

South-Eastern Gas Corporation, Ltd.

ORDINARY GENERAL MEETING

The Second Ordinary General Meeting of the South-Eastern Gas Corporation, Ltd., was held on Wednesday, May 2, at the Registered Offices of the Corporation, 84, Horseferry Road, S.W. 1—Sir DAVID MILNE-WATSON, LL.D., D.L., Chairman of Directors, Presiding.

The JOINT SECRETARY (Mr. G. C. Holliday) read the notice convening the meeting.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN said: Although this is the second ordinary general meeting of the Corporation, it is the first at which there have been any accounts for your Directors to present. The previous meeting, last December, was held to comply with the requirements of the Companies Act, and the accounts now presented for your approval cover the period from Dec. 3, 1932 (the date of incorporation), to March 31, 1934. As these accounts have been in your hands for some time, I assume that you will take them as read.

If you will turn to the balance-sheet you will see that the issued capital consists of 834,817 ordinary shares, 731,111 redeemable 4½% cumulative preference shares, and £450,000 of 4% secured debenture stock. The premium on shares issued amounted to £143,587, and this has been largely utilized for the purpose of writing off capital duty and other expenses connected with the formation of the Corporation and the issuing of the capital, and also the compensation paid to the Directors of the Companies which are now taken over and controlled by the Corporation, and other expenses of acquisition.

Here I may mention that the payment of compensation to the former Directors of the controlled Companies has been of definite benefit to the Corporation, as all the fees which your Directors now receive for acting in their place on the Boards of those Companies are paid into the accounts of the Corporation and amounted during the period under review to £5,710.

After writing off the various items just mentioned there is a balance on the premium account amounting to £26,194, which provides a capital reserve for future use.

If the preference shares are redeemed at any time during the ten years 1970-80 the holders are entitled to a premium amounting to 2½%, and accordingly provision is being made for this by setting aside each year out of revenue a sum to accumulate at compound interest. There are various deposits with the Corporation by the subsidiary Companies and others, amounting in all to £55,497, and £5,546 is due to sundry creditors.

The other side of the balance-sheet shows that the investments in the subsidiary Companies, after writing off the items I have previously mentioned, stand at £2,082,993. A list of the holdings is appended for your information. Loans to subsidiary Companies amounted to £40,769, sundry debtors £1,400, and cash at bank £821.

FINAL DIVIDEND.

Turning to the revenue account, you will see that the income, consisting mainly of course of dividends and interest on investments in the subsidiary Companies, amounted to £76,834, and after allowing for the various expenses set out on the debit side of the account there is a balance of £59,918 to be carried to the net revenue account.

After deducting the preference dividend and the interim dividend on the ordinary shares from this balance there remains a sum of £21,374, out of which your Directors recommend the payment of a final dividend on the ordinary shares of 3%, less tax at 4s. 6d. in the £, making a total dividend of 6%, less tax, for the year ended March 31, 1934. This will absorb the sum of £19,409, leaving £1,965 to be carried forward to the current year.

Since the close of our financial year we have obtained control of the Herne Bay Gas Company, and this will enable us to improve the supply and distribution of gas to the adjacent companies already forming part of the group. During the coming year, if the Directors consider it desirable, we shall continue to negotiate in other directions.

HISTORIC OCCASION.

I shall not be guilty of exaggeration if I describe this meeting as an historic occasion. We have met here to-day to consider the practical results of the first year's trading of an organization novel to the Gas Industry. There are, it is true, other notably successful examples of a linking up between gas undertakings, but the South-Eastern Corporation is a pioneer without exact precedents. It will, therefore, be of some interest to consider briefly on this occasion what the Corporation aims at doing and how far this is significant for the future of the Industry.

A large part of a county has been placed under flexible, centralized control for the production and distribution of gas. This will not sound ambitious to ears accustomed to much talk of nationally and even internationally centralized schemes. The Corporation is admittedly a modest experiment in regional planning. I believe that for that very reason it is the better worth studying. We are extending to a number of relatively small and scattered undertakings advantages in bulk purchase of stores and raw material, in standardization, and in technical information, which can only be at the disposal of a much larger unit. We are doing this to the benefit of the customers of those companies and of the shareholders.

We have tried to avoid the pitfalls into which more ambitious projects are apt to fall. There is no danger in the Corporation of sterilization at the hands of an unwieldy bureaucracy. Individual initiative and experience of local conditions are factors still actively alive in our everyday business.

The undertakings which have come into the scheme were, I am glad to say, controlled by progressive boards and served by loyal and efficient officers. If the Corporation had in any way reduced the responsibility of the "man on the spot," a most important factor in commercial success would have been ignored. In fact, the "men on the spot" retain their executive authority, but they now have behind them allies that no local undertaking, however well run, could possibly enjoy.

In short, the Corporation is a development towards a rationalized Gas Industry, which is being conducted on a strictly practical, businesslike basis. We may, I think, claim, without boasting, to have our eyes on the future, but not so fixedly as to forget that business has to be done and profits made in the present.

REMARKABLE PROGRESS.

The Corporation is I suggest, especially significant at this moment, because the gas industry is now progressing in a most vigorous manner. Times are changing rapidly, and the Industry is changing with them. Behind us lies a winter remarkable for the sales of gas, for the sales of gas appliances, and for the interest aroused in improvements in gas service. The patient attention given to efficiency and to design of our cookers, fires, and water heaters is bearing fruit. New uses for gas in the home—portable heaters, refrigerators, irons, washing machines, to give miscellaneous examples—are adding to the scope of our activities. That is on the domestic side of the business.

The diversity and growth in the application of gas for industrial purposes are equally encouraging. As industry tends to spread to the South of England, it is clearly important that the latest expert knowledge should be at the disposal of undertakings in the areas affected. The Corporation covers such an area, and it has already found the value of being able to call upon the industrial section of the Gas Light and Coke Company.

The same considerations apply when we turn to coke, a fuel which from being no more than a bye-product only a few years ago, is now going ahead as a nationally important source of heat. This healthy progress has been helped by recent advances in the technical means by which coke is consumed. Thermostatic control and automatic stoking now make coke-fired boilers more efficient and labour-saving than those employing other forms of solid fuel. Coke is also a very cheap fuel.

These are some of the signs of the new spirit that is awake in the Gas Industry. Experts in many fields are necessary to keep this spirit alive—engineers and chemists on the production side, administrators on the organization side, and, lastly, but very far from least in this competitive age, there are the salesmen. As inventions and other advances multiply within the Industry, and as competition quickens from without, these experts are becoming more and more necessary. A small undertaking can only command their services by throwing in its lot with larger neighbours. Otherwise it may fail to keep abreast of the latest developments in our great progressive industry and so jeopardize its future.

POSITION OF SMALL UNDERTAKINGS.

Looking at the position generally, the Gas Industry as a whole has never stood more strongly entrenched or with greater certainty of expansion, but, at the same time, the smaller units must perforce consider their future very seriously. That is why I am glad to see the example of the South-Eastern Corporation. I regard the grouping together of gas undertakings in this way as a most practical and effective form of rationalization. It is good for the Industry as a whole, good for the individual undertakings composing the group, good for the consumers, and good, I feel confident, for the shareholders.

We are now completing our organization in the light of the experience gained during the past year. A central buying organization for all the requirements of the Companies in the group has been developed, and special arrangements are being made whereby expert advice on all matters will be available for the constituent Companies whenever they require it. We confidently expect that these schemes will result in still further economies for the benefit of consumers by way of reduced prices of gas and better service.

When I mention that our Companies already serve an aggregate area of approximately 720 square miles, having a total population of 500,000, you will see what enormous scope there is for far-sighted planning on a large scale. Schemes such as centralized production of gas, the development of new areas, better service to consumers, increased facilities for the hire and sale of apparatus, and more profitable marketing of residuals are among the many plans for progress which are having the consideration of your Board.

REDUCED PRICE.

We have already been instrumental in effecting reductions in the price of gas in three of the Companies—in two cases by the

introduction of block rates, which provide for progressively lower prices as consumption increases, and in the third case, a purely residential district where the price was rather high, by a substantial reduction in the flat rate of charge. Reductions in the price of gas are under consideration in the case of several other companies, and will be put into operation as soon as suitable schemes have been decided upon.

At this point it is extremely gratifying to report that this year every company within the group is without exception showing increased production of gas.

I think I have said enough to show what the Corporation hopes to achieve, and, of course, any benefits which we can give to the consumer should react in the course of time to the advantage of the Corporation.

The CHAIRMAN then formally moved the adoption of the report and accounts, this being seconded by Major JULIAN DAY, M.C.

In reply to a question by a shareholder in the Tunbridge Wells Gas Company, who asked if they might now anticipate some reduction in the high price of gas (13d. per therm) prevailing in that area, the CHAIRMAN said that this matter was having consideration, and none would be more pleased than the Board to effect a reduction.

The resolution for the adoption of the report and accounts was then put to the meeting and carried unanimously.

DIVIDEND.

The CHAIRMAN moved the payment of a final dividend of 3%, less tax, on the ordinary shares, making, with the interim dividend already paid, a total dividend of 6%, less tax, for the year ended March 31, 1934.

This was seconded by Major JULIAN DAY, and unanimously agreed to.

RE-APPOINTMENT OF DIRECTORS AND AUDITORS.

On the proposition of Mr. K. W. HICKMAN, seconded by Mr. R. W. FOOT, O.B.E., M.C., the two Directors retiring by rotation —namely, Sir David Milne-Watson and Mr. Henry Woodall, M.Inst.C.E.—were respectively re-elected to the Board.

Thereafter, the Corporation's Auditors, Messrs. Cash, Stone, & Co., were re-appointed to hold office until the next ensuing annual general meeting at a remuneration to be fixed by the Board of Directors; and Mr. WILLIAM CASH, Jnr., briefly acknowledged this renewed expression of confidence.

VOTE OF THANKS.

A hearty vote of thanks was moved, seconded, and unanimously carried from the body of the meeting to the Chairman, Directors, and staff of the Corporation for their services during the year, and also to the employees of all the subsidiary undertakings.

The CHAIRMAN, in response, returned thanks on behalf of himself and his colleagues. The year just passed, he observed, had been an arduous one and at the same time a very interesting one in regard to the Corporation's developments; and the Board felt that they stood before the shareholders with a good story to tell, all auguries pointing to continued success in the future. Their one object was to make this Corporation successful, whose operations would be reflected by a lower price for gas in the subsidiary Companies which they controlled. Things were shaping well, and they were looking forward to a prosperous year.

The meeting then terminated.

Bombay Gas Company, Ltd.

More Favourable Conditions Reported

The Ordinary General Meeting of the Bombay Gas Company, Ltd., was held at the London Offices, Moorgate Station Chambers, E.C. 2, on Friday, May 4—Mr. WILLIAM GRAHAM BRADSHAW, C.B.E. (the Chairman of Directors), presiding.

The SECRETARY (Mr. E. Comber) read the notice convening the meeting, together with the reports of the Auditors; and the Directors' report and statement of accounts for the year ended Dec. 31, 1933, were taken as read.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN, in moving the adoption of the report and accounts, said:

In presenting to you the accounts for the year 1933, I am glad to be able to state that the trading conditions in Bombay during the period under review have been somewhat more favourable than during the previous year or two. Riots and communal disturbances were absent from the daily life of Bombay, and this encouraged business houses to take advantage of the quieter situation to establish improved methods of conducting their businesses which will enable them to meet the changed conditions which most firms in Bombay find they have to face to-day. The continual disturbances during the past few years have, however, left their mark, inasmuch as a large portion of the trade of Bombay has moved to other centres of India; and this is a loss which cannot be regained for some time.

A notable event in the scheme of Indian Constitutional reform was the passing in the Indian Legislative Assembly of a Bill to create what is now known as the Reserve Bank to control and manage India's currency. The Reserve Bank Bill included a clause to maintain the rupee ratio at the present level of 1s. 6d. India is still on a sterling basis, and it is possibly better for all concerned that the present ratio has been adhered to rather than that there should be a creation of a new rupee ratio which in the present disorganized state of the currencies of the world might lead to some confusion.

I usually give you some statistics relating to the exports and imports of India. The exports for last year were £110,500,000, an increase of £7,000,000, while the imports were valued at £87,000,000, which was a decrease of £13,000,000. This has resulted in a balance of trade in favour of India of £23,500,000, which does not take into account £37,500,000 of gold that was exported during the year 1932. Sir George Schuster, the Finance Minister to the Indian Legislative Assembly, stated in his address on the Indian Budget proposals that the financial strength of India challenges comparison with that of any other country in the world, and that there was no country that has brighter prospects or greater potentialities for economic advance than India.

RESIDUALS.

Although the past year has been a peaceful one as regards internal disturbances, certain elements of trading conditions have rather upset our revenue and are reflected in the accounts before you. I refer to residuals. In the case of coke we had to contend with competition from the Bengal Soft Coke Cess Committee, who were able to sell their product at a much less price than our contract rates, and we were forced to enter into fresh contracts at lower prices so that our contractors could compete with the coke oven product.

Then as regards tar, owing to the further depreciation of the yen the Japanese were able to dump tar into Bombay and sell it at absurd prices. As a result our stock of tar increased to an unusually high figure until at one time there was more than 100,000 gallons in stock on the works. After carefully considering the position, in conjunction with the General Manager's urgent recommendation, contracts were placed at prices which enabled the stocks to be considerably reduced and helped us to compete with the Japanese imported tar. We are informed now by Mr. Lane, our General Manager and Engineer, that the dumping of foreign tar has almost ceased, and we are hoping that the intensive competition has disappeared. I am glad to be able to inform you that the prices now being obtained for tar show a considerable improvement on the prices received during the year under review.

TAXATION.

India like many other countries in the world to-day is feeling the effect of heavy taxation. The spending power of the people is considerably reduced, and, naturally, they are economizing to a large extent, which affects the consumption of gas as well as of other necessities of life. In spite of this unfortunate monetary position, our General Manager, in his annual report, mentions that the Fittings Department has been working at full pressure during the year, and not only have gas stoves and other apparatus been introduced into restaurants, but headway has been made on the general industrial side which is most encouraging. The total number of gas appliances issued during the year was 1,500, consisting largely of cooking stoves and geysers. This has been accomplished in the face of severe competition from oil and electricity, and speaks well for the energies of the European and Indian staffs.

The total sale of gas during the year 1933 shows an increase of 10,329,000 c.ft., or 2·2%. This is the first increase that we have been able to record since the year 1929. Actually there was an increase in the sale of gas for heating of 13,641,000 c.ft., or 5·7%, but owing to the Bombay Legislative Council continuing their programme of economy the quantity of gas sold for public street lamps was reduced by 2,129,000 c.ft., or 1·0%.

The amount expended on capital account is slightly less than that of last year because of the automatic writing down of meters producing a credit balance of £31. The capital spent per million c.ft. sold is £816, which is not an unsatisfactory figure for a gas-works operating abroad.

The revenue from the sale of gas to private consumers has increased by £2,807, while that from public lighting has decreased by £446, so that there is a net increase in the revenue from the sale of gas of £2,361. The rental of meters and stoves has increased by £246, which illustrates again the progress made with new installations. As to residuals, I mentioned just now that the competition has been so keen that the revenue from the sale of coke shows a decline of £1,031, although 201 tons more were sold. There was sold to the blue gas plant some 474 tons which were valued at £561. The receipts from the sale of tar show a decrease of £1,429, although some 113,887 gallons more were sold. The average price per gallon realized 2d. less than last year. For the current year we are getting better prices as the Japanese have stopped dumping tar, but

whether the improvement will continue for the whole twelve months of 1934 it is impossible to say.

The total revenue is only £152 more than last year. The smallness of the increase is entirely due to the conditions ruling in the markets of residuals.

On the expenditure side of the accounts coals, together with the coke used in the water gas plant, have cost £1,714 less in spite of 549 tons more being carbonized and £561 being charged for coke used on the water gas plant. The gas sold per ton of coal was 14,795 c.ft., against 15,215 c.ft. in 1932, and Mr. Lane reports that the use of the water gas plant is responsible for reducing the average sale per ton of coal.

Twenty-Four Hour Service.

The cost of distributing the gas throughout the Company's area is £1,435 more. The repair and renewals of mains and services is £94 less, but, owing to extra repairs and increased depreciation, meters and stoves have cost £729 more. The fittings account is more by £898, which is partly accounted for by an increase in wages, but also due to a 24 hours' service which is maintained by the General Manager for the benefit of the public; and although such a system is a little costly, yet in these days of severe competition it is a policy that is essential for the welfare of the Company's business.

Rates and taxes are increased by £1,195, chiefly due to higher income-tax and an arrear due in respect of the previous year.

There is a reduction in management charges of £825, the chief items being a reduction in salaries of £240 and a less amount of £623 being spent for general charges owing to the cost of removing and fitting up the Company's new showroom and offices having been borne in 1932. The item of bad debts I should like to mention specially, as, with a turnover of some £160,000, it is excellent to be able to show only a loss of £22 16s. on this account. Passages account is, of course, a varying figure, and this year there is a saving on last year of £566. The total expenditure is more by £892, due mainly to the extra cost of repairing more meters and stoves and to the increase in the charge for income-tax.

The result of the working for the year shows a profit of £21,253 9s. 5d., which is £740 less than the previous year. There is an advantage in remitting money to England of £5,756, which is £34 less than in 1932 in spite of more remittances having been received, and is due to slightly lower rates being quoted at the time that the Reserve Bank Bill was being discussed by the Government of India, which affected the exchange temporarily, owing to a demand by a section of the Indian people to fix the rupee rate at 1s. 4d. The average rate of remittances was 1s. 6·05d., against 1s. 6·09d. per rupee.

Adding to the profit of £21,253 the item of exchange and allowing for the cost of interest, there is a net profit of £26,101. The undivided profit brought forward from the year 1932 was £39,419, which makes a total available profit of £55,520. After deducting from this sum the interim dividend of 3½% paid in November last, amounting to £10,500, and the additions to the reserve and renewal funds of £2,520, there remains £52,500 0s. 10d., out of which a final dividend of 4½% (less income-tax) is recommended, making 8% (less income-tax) for the year. The final dividend will absorb £13,500, so that a sum of £39,000 0s. 10d. is carried forward to the current year, which is £419 less than the amount brought into account from the year 1932.

Increasing the Carry-Forward.

In this connection I should like to mention that it has been our policy gradually to build up the amount to be carried forward each year. When I joined the Board in 1905 the sum carried forward was only £3,363, and it has steadily increased until now the balance covers the 8% dividend more than 1½ times.

As regards the balance-sheet, the only feature is the increase in the cash at bankers on deposit and in hand to £26,591. For many years we had a temporary loan from our bankers of varying sums, and at one time we owed £49,000. We have not only extinguished the loan, but have erected a new 3-lift gasholder of 1½ million c.ft. capacity at a cost to the revenue of over £28,000, so that I think you will agree that the Company's financial strength shows a substantial if gradual improvement.

We had the pleasure of Mr. Lane's presence at our meeting last year when he told you that the works and distribution system were in thorough working order, and that we have a well-laid-out works which is almost self-contained, and an efficient plant.

Mr. Dickson's Retirement.

You have no doubt missed a familiar and much appreciated name from the printed report and accounts. Our late Secretary and friend, Mr. Alexander Dickson, during the past year reached the age for retirement and handed over the secretarial office to his second-in-command after a period of service extending over 27 years. I am glad to be able to bear testimony to the satisfactory way in which he discharged the duties of his office and the careful and conscientious manner in which he served the Company. We owe him a debt of gratitude for the good work which he did, and we wish him many years of happy and restful retirement—a wish in which I have no doubt you will all join. ["Hear, hear."]

In Mr. Comber, whom the Directors were unanimous in appointing to the vacant office of Secretary, we have a tried and tested Officer of the Company who has already given us 33 years of satisfactory service. I trust that he will live for many years to enjoy the promotion which he well deserved and which came to him somewhat tardily. I cannot speak too highly of his zeal and industry. I also desire to commend the conscientious support which the other members of our London staff give to him.

With regard to our European staff in India, no praise which I can give them would speak too highly of the confidence we have reason to place in them. In Mr. Lane, who has already given the Company 34 years of most efficient service, first as Assistant Engineer and for the last nine years of that time as General Manager and Engineer in Bombay, we have one who has the confidence and respect not only of his Directors and the employees of the Company, but of all classes both of Indians and Europeans in Bombay. His high character and ability have been (and I hope for many years will be) of very great value to the Company. He seems able to defy the rigours of the climate and the passing of years, and you will be glad to know that apparently he has completely recovered from the serious illness which he had two or three years ago and enjoys excellent health and unimpaired energy and powers of work despite the 34 years which he has spent in the tropics. His presence as our representative in India is a valuable asset to the Company. Of Mr. Boulter, our second-in-command, Mr. Lane speaks in the highest terms. He was young and somewhat inexperienced when he first went out, but he has been severely tried and tested and has made good in every way. We have great confidence in him. He is both able and reliable.

Mr. Gladstone, who is Deputy Assistant Engineer and whose services we share with the Oriental Gas Company to the complete satisfaction of both Boards of Directors, is a highly trained and efficient Engineer, and he gives to the Managers of both Companies an assured confidence that we have in him in case of need one upon whom we can thoroughly rely for whatever position he may be called upon to fill.

I have spoken in high terms of our Officers, but I am sure my colleagues will agree that I have not said one word of praise more than is thoroughly deserved, and I should like our Officers to know that we, and you, appreciate their loyal and faithful service. The other members of our European staff whom I have not time to mention by name also serve the Company most willingly and efficiently.

Indian Employees.

I must add a word about the rank and file of our Indian employees. They are undeniably well treated, both as regards the pay they receive and the gratuity given them when they retire, and in return they give us whole-hearted loyalty and their full confidence. It is years since we had any trouble with our workmen, although, as you doubtless know, Bombay is the headquarters of the Congress, and disaffection and rebellion are rife there. They are subject to constant inducements to join the disaffected, but, in spite of it, they remain true to their employers often at considerable risk to themselves.

With regard to the prospects of the Company, so far as one can see they are distinctly improved. We have bought our coals well, and the price of our residual products is somewhat increased. I believe our customers—including the Municipality—are well satisfied with the service we give them, although, naturally, they would welcome a decrease in the price of gas (so should we); but at present conditions do not warrant it, and the most we can expect is to carry on earning our modest dividend until circumstances change for the better and the trade of the city improves.

The Chairman then formally moved:

> That the report of the Directors and the statement of accounts for the year ended Dec. 31, 1933, now submitted, be and the same are hereby received and adopted.

The Deputy-Chairman (Mr. H. H. Macleod) seconded the resolution.

Capt. W. J. Liberty said he presumed that the decrease in the receipts from public lighting was merely due to the fact that the Municipality had shortened the burning hours.

The Chairman replied in the affirmative.

The resolution for the adoption of the report and accounts was then put to the meeting and carried unanimously.

Dividend.

The Chairman next moved:

> That a final dividend for the year ended Dec. 31, 1933, of 4½% (less income-tax at the rate of 2s. in the £) be now declared, payable on and after May 7, 1934, making with the interim dividend of 3½% a dividend of 8% for the year.

This was seconded by the Deputy-Chairman and unanimously agreed to.

Re-Election of Directors and Auditors.

In moving the re-election of the two Directors retiring by rotation—namely, Mr. H. H. Macleod and Mr. A. M. Paddon, M.Inst.C.E.—the Chairman remarked that if they were to search the land for the best Directors for an Indian gas company they would not find any better than these two gentlemen. Mr. Paddon's name was a household word in the Gas Industry, while Mr. Macleod was of the greatest assistance to them in regard to the buying of their coals and in many other matters.

Mr. Stanley H. Jones, M.Inst.C.E., seconded the resolution, which was carried unanimously, both gentlemen briefly acknowledging their re-election.

On the proposition of Mr. A. R. Burch, seconded by Mr. H. F. Hills, the Company's Auditors, Mr. Alfred Morland, F.C.A., and Mr. F. J. Bradfield, F.C.I.S., were unanimously reappointed for the ensuing year at the same remuneration as

BY APPOINTMENT
IRON FOUNDERS
TO H.M. THE KING

CARRON

GAS COOKERS

with "Carrontrol" Patent Automatic Heat Controller

Exhaustive and prolonged tests have proved beyond doubt that Carron Gas Cookers, fitted with the "Carrontrol" Patent Automatic Heat Controller, will compare favourably with any other similar appliance on the market

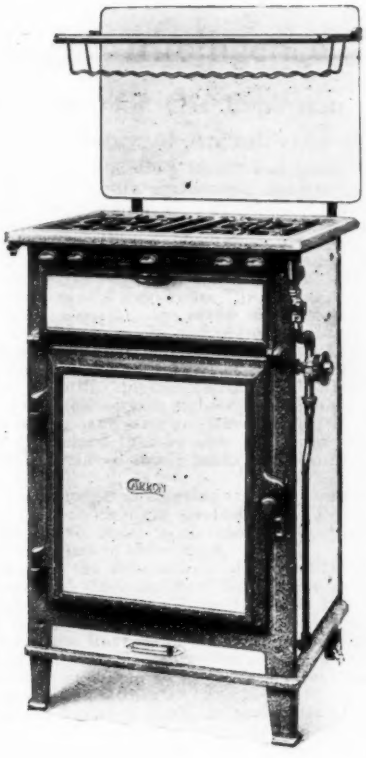


Illustration shows Cooker fitted with Canopy Hot Closet, which can be fitted to three sizes of Cookers.

CARRON COMPANY · ESTO PERPETUA · FOUNDED 1759 · INCORPORATED BY ROYAL CHARTER 1773 ·

Nos. 658, 660, & 662 GAS COOKERS

This Series of Gas Cooker embody many fresh and interesting features and are a decided advance in high efficiency Gas Cookers. Flue Outlet in these Cookers is at the bottom of back of oven, which ensures even heating throughout.

℄ *Illustrated and Descriptive Catalogue No. 6F post free.*

CARRON COMPANY WORKS : CARRON, STIRLINGSHIRE

Technical Signpost for 1933

"... In these days of voluminous writings ('of making new books there is no end'), it is indeed a relief to receive so convenient a summary of the year's progress in the technique of the gas industry. One can see in one's mind, a row of these little volumes extending from year to year. ..."

"... We know from long personal use of the files of our contemporary how valuable this new publication would have been in past years, and having carefully studied the present volume and tested it by bringing our enquiries to it, we are glad to greet it warmly and recommend it unreservedly. Its paragraphs have been skilfully and lucidly prepared. ..."

(Extracts from Reviews)

TECHNICAL SIGNPOST

***Price* 3/6**

post free

Orders and Enquiries to:

WALTER KING, LTD.

11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

heretofore; and Mr. MORLAND and Mr. BRADFIELD briefly returned thanks.

VOTE OF THANKS.

Mr. F. W. CRUTTENDEN proposed a hearty vote of thanks to the Chairman and Directors for their services during the year, and said they were indebted to the Chairman for his exhaustive review of the Company's affairs which he had just given to them.

Capt. LIBERTY, in support of the vote, referred to the paper read last September before the Association of Public Lighting Engineers at their Margate Conference by the Company's Public Lighting Superintendent, Mr. J. P. Blackmore, on the subject of the development of public lighting in the city of Bombay. He said that they had heard previously of the excellent public gas lighting in Bombay; but this paper was the first opportunity they had had of gaining detailed information regarding it.

The CHAIRMAN, having acknowledged the vote, went on to move a vote of thanks to the staff in London and Bombay for their efficient services, this being seconded by the DEPUTY-CHAIRMAN and carried unanimously.

The SECRETARY returned thanks on behalf of Mr. Lane and his staff for their kind vote, which he said he would have much pleasure in transmitting to him by the next mail. They thoroughly deserved the shareholders' expression of appreciation of their efforts during the past year. He also thanked them on behalf of the London staff, and remarked that he could not allow this opportunity to pass without expressing his gratitude to the Chairman for the kind words he had just used.

The meeting then terminated.

Register of Patents

Gas Fires.—No. 400,737.

GILL, G. M., of Westminster.

No. 20,843; July 23, 1932.

A gas fire according to this invention is adapted to be installed in front of an ordinary coal or coke fireplace during the warm weather or when fires are only needed occasionally. The fire comprises an ornamental screen to which a casing containing the incandescent elements and flue is attached. The screen is provided with a handle for carrying.

The screen is attached to a metal carcase housing a casing in which are placed the incandescent elements, burner, and flue. The carcase is open to the atmosphere at its lower rear portion. The inner casing is so made that no products of combustion can enter the outer casing.

When the fire is lighted, air enters the outer carcase at the lower rear portion, and in passing upwards between the inner and outer casings and round the flue is warmed and is allowed to escape through a louvred opening in the front of the screen at the upper edge.

Increased efficiency is obtained by utilizing the heat in the waste gases and the circulating air serves also to prevent the inner casing behind the radiants from becoming overheated. Reflectors may be provided at the bottom and also at the sides of the radiants. The screen itself is insulated from the carcase by non-conducting material, and it is thereby kept sufficiently cool, so that discoloration of the metal is prevented. Doors are fitted to the front of the screen.

Gas Fire Construction.—No. 399,878.

UNITED GAS INDUSTRIES, LTD., of Lincoln's Inn Fields, W.C. 2, and BLANCHFORD, R. F., of Clysthydon, Devonshire.

No. 10,898; April 16, 1932.

A special object of this invention is to provide a brick for gas fires to engage and cover over the upper part of the refractory "fuel." The brick is provided at a determined position with an overhanging part or flange and a closed pocket or pockets to the rear of the flange into which the upper ends of the refractory fuel extend, the waste gases passing to the flue over the front of the overhanging part. The brick may be formed of two sections, on the upper section of which the overhanging part is provided.

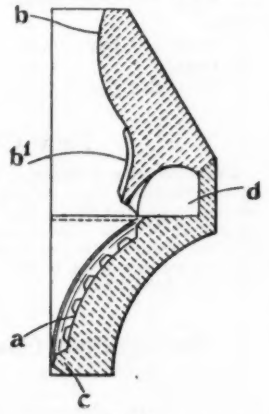


Fig. 1.

Fig. 1 represents a cross-sectional view of the brick lining, the upper section being applied upon the lower section.

The brick is provided in two sections *a*, *b*, set one upon the other, the lower section *a* being provided of a curved shape in transverse cross-section, and adapted for the reception of refractory "fuel" of a corresponding curvilinear form disposed in adjacent vertical planes, the lower part of the "fuel" adjacent the fender extending forward and the upper part thereof receding to engage beneath the overhanging front flange b^1 of the upper section *b* of the brick. Such a brick may be stepped in known manner, the central part *c* of the lower section *a* being disposed in front with panels at each side receding backward stepwise, whereby the "fuel" may thus be supported upon surfaces in a somewhat bow-shape or arrangement, by which the "fuel" is thus adapted for the radiation of heat in a very wide angle. The overhanging front flange b^1 of the upper section *b* extends forward at a position immediately above the upper end of the curved surface of the lower section *a* upon which the "fuel" is supported to provide a pocket or recess *d* into which the upper ends of the "fuel" may be freely passed in order that their lower ends may be brought into position over the appropriate nozzles of the burner.

Legal Intelligence.

Damages for Gas Explosion.

Notice of Appeal.

Notice of appeal on plaintiff's behalf was given in a County Court action by a Plymouth confectioner against the Plymouth and Stonehouse Gas Company for £54 damages caused by a gas explosion at her shop, reserved judgment in which was given on Tuesday, May 1, in the Company's favour.

The plaintiff was Miss Mabel Helma Atwill, aged 19, who sued through her mother in respect of the explosion, which occurred just before Christmas at a shop at 10, The Parade, The Barbican, of which she was in charge, the claim for damages comprising loss of trade, damage to stock, and personal injury. [A report of the hearing was given in the "JOURNAL" for April 11, p. 88.]

Addressing his honour Judge Lias, Mr. H. O. Stidston Broadbent, for the plaintiff, quoted decisions of other Courts in similar cases in which certain judges had maintained that to put gas pipes in the land was unnatural use of it, and that it was no defence to plead that because gas pipes were properly laid a leak which occurred thirty years afterwards could not be helped.

Mr. Mayburne Pearce, representing the Gas Company, pointed out that the defendants were protected by Private Acts of Parliament, and were under a statutory obligation to supply customers and keep gas in their pipes.

After listening to the submissions of the solicitors on either side for an hour and three-quarters his Honour gave judgment for the Company, with costs. He said that if Miss Atwill had been entitled to damages he would have assessed them only at £12 3s. 6d. What the fracture in the main causing the leak was due to he could not say. The pipe was in such a condition that frequent inspection appeared to be necessary, but the claim for negligence was not established.

Notice of appeal was then given, as previously stated.

Trade Notes.

Pneumatic Gas Lighting Company, Ltd.

Intimation has been received from the above firm that they have removed from No. 39 to No. 37, Farringdon Road, London, E.C. 1.

Electrical Precipitation Plant for Blast Furnace Gas Cleaning.

The Whessoe Foundry and Engineering Company, Ltd., of Darlington, have recently received an order from Messrs. Colvilles, Ltd., of Glasgow, for a blast furnace gas cleaning plant to be installed at the Clyde Ironworks. The plant is to be on the Whessoe electrical precipitation system, and, except for the use of a small quantity of water for pre-cooling, will be entirely dry in operation. The plant is to cool, clean, and boost 4 million c.ft. of gas per hour.

Electrostatic Tar Precipitators.

During the last three months Messrs. Simon-Carves, Ltd., of Cheadle Heath, Stockport, have received orders from the following companies for Simon-Carves' electrostatic tar precipitators to clean the gas from their coke ovens:

	Gas to be Treated per Day.
Blaenavon Company, Ltd.	5 million c.ft.
Houghton Main Colliery Company, Ltd.	6¼ ,,
Consett Iron Company, Ltd.	20 ,,

The first two plants are for removing the tar from the gas at a temperature of about 100° C. direct from their foul gas main, and in the case of the last plant from the cooled gas before their exhausters.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The outstanding features on the Stock Exchange last week centred round the gilt-edged and rubber markets. In the former section the liquidation, which set in after the Budget statement, came to an end, and buying recommenced on a large scale with a consequent hardening of prices. Rubber shares were active by reason of the new restriction scheme, and an exceptionally heavy volume of business was recorded. Other markets were for the most part dull and uninteresting. This week sees the opening of a new three-week Account, and steady investment buying is anticipated with perhaps an outburst of activity here and there among specialities. The Stock Exchange Committee have decided to close the "House" on Saturdays during June, July, and August, as well as on Whitsun Saturday (May 19).

The Gas Market was well supported, especially during the latter part of the week, and though several transactions were recorded a point or two above those of the previous week this in some instances did not affect the quotations. It will be seen by reference to the Stock and Share List that only five price changes took place, four of which were improvements. The fractional fall in European stock was due entirely to a narrowing of the margin from 10 to 5 points, business being done at 124½ against last week's highest of 122.

At the time of writing the list of ordinaries on offer includes several parcels of stocks and shares not usually readily obtainable the yields on which are attractive. Among these are the following:

Amount Offered.	—	Dividend.	Price.	Yield. %
£		%		£ s. d.
120	East Hull 5%	5	109	4 11 9
430	Hong Kong and China £1 .	8	31s.	5 3 2
400	Newquay original £1 . .	10	43s. 6d.	4 12 0
60	North Middlesex. . . .	7½	160	4 13 9
467	Oxford District	10	212	4 14 4
315	Plymouth	8	172	4 13 0
1,224	Portsmouth	8	173	4 12 6
200	Southgate 7% maximum .	7	154	4 11 0
190	Wellington (Salop) . . .	7	148	4 14 7

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *May 7.*

There is but slight change in the tar products market, with prices at the following levels:

Pitch, 57s. 6d. per ton f.o.b.

Creosote, 3¼d. to 3½d. per gallon.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole, 2s. 6d. to 2s. 7d.; pure benzole, 1s. 9d. to 1s. 10d.; 95/160 solvent naphtha, 1s. 8d. to 1s. 9d.; and 90/140 pyridine bases, about 6s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

May 7.

The average prices of gas-works products during the week were: Gas-works tar, 24s. to 29s. Pitch—East Coast, 56s. 3d. to 58s. 9d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 56s. 3d. to 58s. 9d.* Toluole, naked, North, 2s. 0½d. to 2s. 2½d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North. 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid, and salty, 2¾d. to 3d.; low gravity, 3d. to 3¼d.; Scotland, 2⅝d. to 2⅞d. Heavy oils, in bulk, North, 3¾d. to 4¼d. Carbolic acid, 60's, 2s. 2d. to 2s. 3d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *May 5.*

Throughput continues satisfactory, and fresh orders are more numerous. Prices show little or no alteration during the week, but, if anything, they are steadier.

Crude gas-works tar.—The actual value is 35s. to 37s. per ton *ex* works.

Pitch.—Value in this district is purely nominal at about 45s. to 47s. 6d. per ton f.o.b. Glasgow for export and 45s. per ton *ex* works in the home market.

Refined tar.—Business is keenly sought after, and the price is unchanged at 3d. per gallon *ex* works naked.

Creosote oil.—This continues a good market with prices firm. B.E.S.A. Specification oil is 4d. to 4¼d. per gallon; low gravity, 4¼d. to 4⅜d. per gallon; and neutral oil, 4¼d. to 4½d. per gallon—all f.o.r. in bulk.

Cresylic acid.—Prompt supplies are still difficult to secure, and makers are not anxious to quote. To-day's values are approximately as follows: Pale, 97/99%, 1s. 2½d. to 1s. 3½d. per gallon; dark, 97/99%, 1s. to 1s. 1d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha is changing hands at from 4⅜d. to 3¼d. per gallon, according to quality and quantity.

Solvent naphtha.—There is little demand and prices are unchanged. 90/160 grade is 1s. 4d. to 1s. 4½d. per gallon, and 90/190 grade 8d. to 8½d. per gallon.

Motor benzole is still valued at 1s. 6d. to 1s. 7d. per gallon, with production small.

Pyridines.—90/160 grade is 5s. to 5s. 3d. per gallon, and 90/140 grade 5s. 6d. to 6s. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d		s. d.	
Crude benzole . . .	0 9	to	0 9¼	per gallon at works
Motor ,, . . .	1 4	,,	1 4½	,, ,, ,,
90% ,, . . .	1 4½	,,	1 5	,, ,, ,,
Pure ,, . . .	1 7½	,,	1 8	,, ,, ,,

Contracts Advertised To-Day.

Coal.
Sittingbourne and Milton Gas Department. [p. 340.]

Exhauster, &c.
Greenock Gas Department. [p. 340.]

Gas Fittings, &c.
Leeds Gas Department. [p. 339.]

Mantles.
Leeds Gas Department. [p. 339.]

Paint.
Carlisle Gas Department. [p. 340.]

Painting Gasholders.
Carlisle Gas Department. [p. 340.]

Pipes, &c.
Leeds Gas Department. [p. 339.]

Stores.
Leeds Gas Department. [p. 339.]

Tin Plates.
Leeds Gas Department. [p. 339.]

New Capital Issues.

Chichester Gas Company.—The tenders sent in for the £5,000 4½% preference stock, which were offered by Messrs. A. & W. Richards on behalf of the Directors of this Company, were opened on May 3. They amounted to a total of £25,475 at prices ranging from £110 per £100 down to the minimum of par. The lowest accepted tender was at £106 1s., and the average obtained £106 19s.%.

Metropolitan Gas Companies' Testings.

The Gas Referees' report on the official testings for the past quarter gives the following average calorific values for the gas supplied by the Metropolitan Companies named:

Commercial Gas Company.—502·4 B.Th.U. (declared calorific value, 500 B.Th.U.).

Gas Light and Coke Company.—502·1 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—561·9 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—562·7 B.Th.U. (declared calorific value, 560 B.Th.U.).

Tottenham and District Gas Company.—500·7 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth and District Gas Company.—501·1 B.Th.U. (declared calorific value, 500 B.Th.U.).

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. May 5. (Provincial Exchanges May 4.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Apl. 9	7	7	Alliance & Dublin Ord. ...	128—138	...	136½
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	90—100	...	98
557,655	,,	Mar. 5	7	7	Barnet Ord. 7 p.c.	165—170	...	...
300,000	1	Oct. 28	1/9⅔	1/4⅔	Bombay, Ltd.	27/—29/-	...	28/-
178,480	Stk.	Feb. 19	9⅛	9½	Bournemouth sliding scale	203—208	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	162—167	...	164½—167
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	142—147	...	144—146
50,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb. ...	79—84	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—107	...	105—106½
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	120—125	...	122—126
357,900	,,	Mar. 5	7½	7½	Brighton, &c., 6 p.c. Con. ...	161—166	...	...
540,000	,,	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	149—154	...	...
195,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	135—140	...	...
1,487,500	,,	Mar. 5	5	5	Bristol 5 p.c. max.	115½—116½a	+1	...
120,420	,,	Dec. 18	4	4	Do 1st 4 p.c. Deb. ...	104—106a	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	104—106a	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	123—125a	...	...
885,000	,,	Apl. 9	7	8	British Ord.	153—158	...	154½
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref. ...	153—158	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	106—111	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—102	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	109—114	...	...
160,000	,,	Jan. 8	5	5	Cambridge 5 p.c. Deb. ...	115—120	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	2—4	...	...
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref. ...	6—7	...	...
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb. ...	95—100	...	98½—99½
626,860	,,	Feb. 19	6	6	Cardiff Con. Ord.	126—131	...	...
237,860	,,	Jan. 8	5	5	Do. 5 p.c. Red. Deb.	103—108	...	...
157,150	,,	Feb. 19	5	6⅛	Chester 5 p.c. Ord.	112½—122½b	...	...
98,996	1	Oct. 9	2/-	2/-	Colombo, Ltd. Ord.	1 7/16—1 11/16	...	...
24,500	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref. ...	19/- —21/-	...	19/9
609,204	1	Mar. 19	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	1 7/16—1 9/16	...	...
296,053	1	,,	1/8'80	1/8'80	Do. 8 p.c. Pref.	22/6—24/6	...	...
1,775,005	Stk.	Feb. 19	5	6⅔	Commercial Ord.	120—125	...	120½—122½
475,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb. ...	77—82	...	...
286,344	,,	Mar. 5	5	5	Do. 5 p.c. Deb. ...	119—124	...	...
807,560	,,	Feb. 19	7	7	Croydon sliding scale ...	158—158	...	158½
569,590	,,	,,	5	5	Do. max. div.	105—110	...	108—109
620,395	,,	Jan. 8	5	5	Do. 5 p.c. Deb. ...	121—126	...	...
542,270	,,	Mar. 5	7	10	Derby Con.	175—180e	...	...
55,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	98—100e	...	...
209,000	,,	Feb. 19	5	5	East Hull Ord. 5 p.c. ...	106—111	...	109
181,623	,,	Mar. 5	6	6	East Surrey Ord. 5 p.c. ...	126—131	...	...
175,609	,,	Dec. 18	5	5	Do. 5 p.c. Deb. ...	118—123	...	...
1,009,180	,,	Apl. 9	15	17	European, Ltd.	122—127	—½	120½—124½
19,342,763	,,	Feb. 19	5⅔	5⅔	Gas Light & Coke 4 p.c. Ord.	96/6 —97/-f	...	96/7½—97/-
2,600,000	,,	,,	3⅔	3⅔	Do. 3⅔ p.c. max. ...	87—90	...	87½—88½
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	103—106	...	104—105½
6,102,497	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb. ...	84 87	...	85⅔—87
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	116—119	...	117⅔
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	114—117	...	115—115⅔
270,466	,,	Mar. 5	6	6	Harrogate New Cons. ...	126—130	...	...
82,500	,,	Mar. 5	7	7	Hastings & St. L. 5 p.c. Conv.	147—152	...	150—151½
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv	115—120	...	119—119½
140,000	1	Apl. 23	1/7½	1/7½	Hongkong & China, Ltd. ...	28/6—31/6*	...	30/6
218,200	Stk.	Mar. 5	6	6	Hornsey Con. 3½ p.c. ...	128—133	...	...
5,600,000	,,	Nov. 6	14	10	Imperial Continental Cap.	207—212	+2	207—211
223,130	,,	Feb. 5	3½	3½	Do. 3½ p.c. Red Deb.	89—94	...	...
235,242	,,	Mar. 5	8½	8½	Lea Bridge 5 p.c. Ord. ...	169—174	...	171
2,167,410	,,	Mar. 5	6	6	Liverpool 5 p.c. Ord ...	130—132b	...	...
245,500	,,	Dec. 18	5	5	Do 5 p.c. Red. Pref ...	101—111b	...	...
306,083	,,	July 17	4	4	Do. 4 p.c. Deb. ...	101½—103½b	...	...
165,736	,,	Feb. 19	8	10	Maidstone 5 p.c. Cap. ..	180—190	...	...
56,176	,,	Jan. 8	3	3	Do. 3 p.c. Deb. ..	72—77	...	...
75,000	5	Dec. 4	†10	†10	Malta & Mediterranean ..	9 - 11	...	...
392,000	,,	Apl. 3	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb. ...	96 -101	...	...
231,978	Stk.	Feb. 19	5	5	M. S. Utility "C." Cons. ...	113 -118	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95 - 100	...	98½—99
360,075	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	117 - 122	...	...
675,000	,,	21 May '31	16	6	Montevideo, Ltd.	60 - 70	...	63—64½
2,061,315	,,	Mar. 5	5	5½	Newcastle & Gateshead Con.	25/3 -25/9d	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	99 -101d	...	...
776,706	,,	Jan. 8	3½	3½	Do. 3½ p.c. Deb. ...	92 -93d	...	...
277,285	,,	Nov. 6	5	5	Do. 5 p.c. Deb. '43 ...	105 -107d	...	...
274,000	,,	Feb. 19	5	5	Newport (Mon.) 5 p.c. max.	106—108a	...	...
204,940	,,	Mar. 19	7½	7½	North Middlesex 6 p.c. Con.	155 - 160	...	157
396,160	,,	Feb. 5	5	5	Northampton 5 p.c. max. ...	99 - 104	...	...
300,000	,,	Dec. 4	7	†9	Oriental, Ltd.	150—155	...	150½—151
316,617	,,	Dec. 18	8	8	Plym'th & Stonehouse 5 p.c.	165—170	...	167
504,416	,,	Feb. 19	8	8	Portsm'th Con Stk. 4 p.c. Std	168 - 173	...	172½
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105—110	...	107—107½
114,000	,,	Feb. 19	5	5	Preston 5 p.c. Pref. ...	103—108	...	...
686,312	,,	Jan. 22	4	4	Primitiva 4 p.c. Rd. Db. 1911	87 -92	...	91
389,813	,,	Dec. 14	4	4	Do. 4 p.c. Cons. Deb.	98 - 93	...	90½—93½
150,000	10	Mar. 19	6	6	San Paulo 6 p.c. Pref. ...	7- 8	...	...
1,736,968	Stk.	Mar. 19	6	6	Sheffield Cons.	134 -136e	...	...
95,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	96 - 100e	+2	...
133,201	,,	Feb. 19	8½	5	Shrewsbury 5 p.c. Ord. ...	135—140	...	137
90,000	10	June 12	15	14	South African	2½—4½	...	...
6,709,895	Stk.	Feb. 19	5	7	South Met. Ord. ...	131—134	...	130½—132½
1,135,812	,,	,,	6	6	Do 6 p.c. Irred. Pf.	138 - 143	...	141½—143
850,000	,,	,,	4	4	Do 4 p.c. Irred. Pf.	102—106	...	105
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb ...	84—87	...	85½—86½
1,000,000	,,	Jan. 22	5	5	Do 5 p.c. Red. Deb.	114—117	...	...
209,820	,,	Mar. 5	8½	8½	South Shields Con.	166—167d	...	...
1,543,795	,,	Feb. 19	6	6	South Suburban Ord. 5 p.c.	130—133	...	130½—132
512,825	,,	,,	5	5	Do. 5 p.c. Pref.	117—122	...	119½—120
300,000	,,	,,	—	4	Do. 4 p.c. Pref.	103—108	...	104
868,337	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	120—125	...	122½—124½
100,000	,,	,,	4	4	Do. 4 p.c. Deb.	163—108	...	...
647,740	,,	Mar. 5	5	5	Southampt'n Ord. 5 p.c. max.	109—114	...	...
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	100—105	...	101
350,000	,,	Mar. 5	5½	5½	Swansea 5½ p.c. Red. Pref.	106—111	...	...
200,000	,,	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb.	103—108	...	...
1,076,490	,,	Mar. 5	6⅔	6⅔	Tottenham and District Ord.	148—153	...	151—152½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ..	123—128	...	126—127
62,285	,,	,,	5	5	Do. 5 p.c. Pref. ...	112—117	...	113½
199,005	,,	Dec. 18	4	4	Do. 4 p.c. Deb. ..	97—102	...	...
85,701	,,	Apl. 9	6	6	Tuscan, Ltd. 6 p.c. Red. Db.	90—100	...	...
349,110	,,	Mar. 5	7	7	Uxbridge, &c., 5 p.c. ...	150—155	...	154½
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	112—117	...	...
1,322,220	,,	Mar. 5	7	7	Wandsworth Consolidated	155—160	...	157—159
1,096,378	,,	,,	5	5	Do. 5 p.c. Pref.	119—124	...	122½—123
1,317,964	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	122—127	+2	123—125
158,400	,,	Mar. 5	5	6g	Winchester W. & G. 5 p.c. Con.	115—120	...	...

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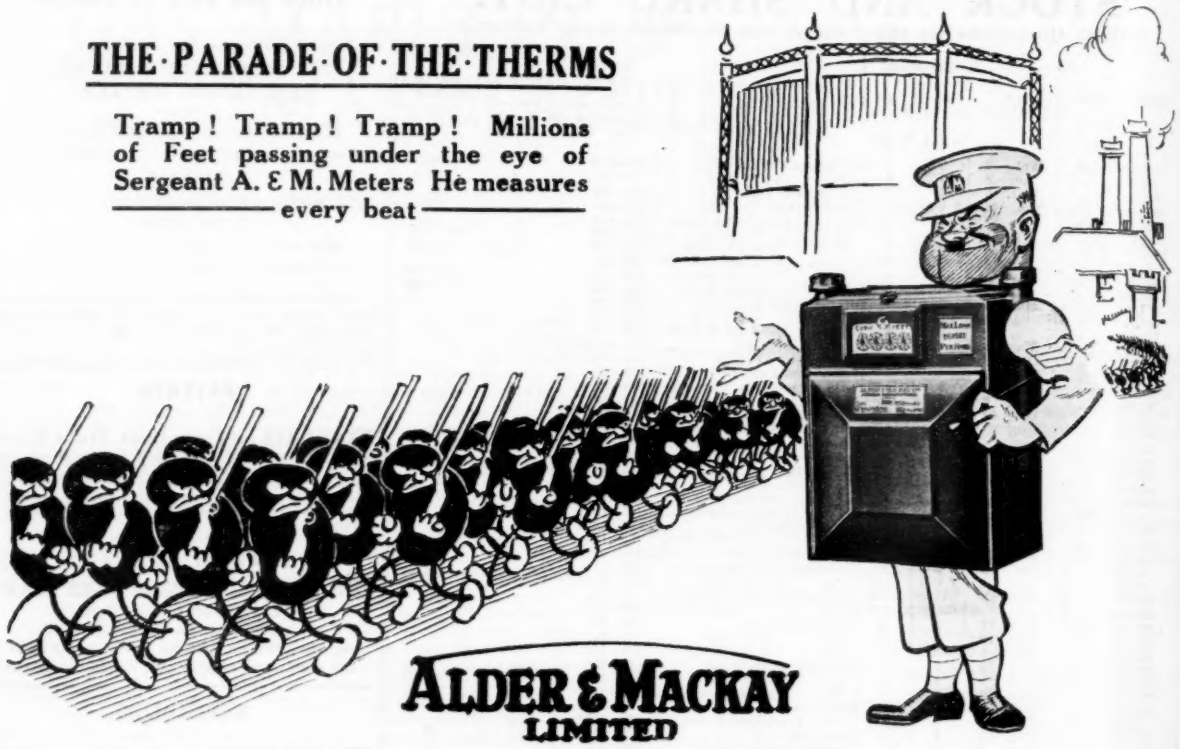

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Weight	1 cwt.
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